UNIVERSITY LIBRARY PLANNING : A COMPARATIVE STUDY

By

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ABSTRACT

Many university librarians in South Africa have recently or shortly will experience space shortages and will be planning either a new library or an extension to an existing building. This study is intended to provide those librarians with information and ideas relevant to library planning. It briefly reviews university library planning in South Africa, outlines those qualities considered desirable by the British architect Faulkner Brown, and describes space standards as developed in South Africa, Great Britain and the United States of America. Examples of successful university libraries are drawn from each of these countries. The centralization versus decentralization controversy and the linear library system are discussed, and recent developments in libraries which may influence planning are considered. From observations and discussions in the three countries mentioned, an attempt is made to identify building requirements that will enable university libraries constructed today to accommodate developments and changes into the 21st Century.

DECLARATION

I declare that this dissertation is my own unaided work. It is being submitted for the degree of Master of Arts in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

J. Edwards

9th day of August 1985

In memory of my father Frank Belford Edwards, 1912-1977

PREFACE

The growth of universities and library collections in South Africa in recent years has resulted in a need for greater knowledge, awareness and participation in the planning process on the part of librarians than was previously considered necessary. It is important that library planners establish what factors are influencing trends in building planning and design. Such factors are likely to include the diverse needs of library users, the growth in the use of audio-visual material and advances in technology, including the increasing use made of computerized systems. The effect of the computer is of concern to most university librarians, who for some time have been unsure of the extent to which automation may at any moment call for radical departures from existing practice. Despite all the flexibility that goes into modern library buildings, it is not beyond the realm of possibility that one could make serious miscalculations. Planning a building which is to accommodate needs for twenty years is thus no easy matter.

Historically, all developments in the communications field have added to the cumulative total without replacing one another. Computer-based information retrieval adds a new dimension to established library services in the same way. First came the manuscript, then the printed page, to these have been added microprint of all kinds, audio-visual material in various formats, and finally the computer with its numerous adaptations. Possibly the university library of the future could be anticipated as a yet more sophisticated complex of the traditional bookstock plus a multitude of forms including computer-based information, either online or in hard copy. These developments may well have an effect on the design of library buildings.

Much of what has been written on the subject of library planning in this country is now of historical interest, and there is a need to take a new look at the subject in the light of recent and possible future developments. In this study current trends in library planning in South Africa will be reviewed, comparable libraries in the United Kingdom and the United States of America observed, and the extent to which overseas developments have influenced or are likely to influence planning in this country assessed. The effects on university library planning in South Africa of the system of space and budgetary norms recently introduced by the Department of National Education will also be discussed, and parallels drawn from those systems operating in Britain and the United States. Cognisant of the on-going debate amongst academics and librarians on the future shape of books and libraries (electronic versus printed books and journals), and the advent of the 'new technology' in libraries, special attention will be paid to these aspects in terms of library planning.

It is hoped that from this study will emerge an indication of future trends in library planning and design in this country, as well as ways in which provision may be made for these aspects now.

In researching this study, the following libraries were visited by the author:

1. **Great Britain**
   - Barbican Arts Centre Library, London
   - Brighton Polytechnic Library
   - City Business Library, London
   - Edinburgh University Library
   - Guildhall Library, London
   - Loughborough University of Technology Library
   - Nottingham University Library
   - Portsmouth Polytechnic Library

St Andrews University Library, Scotland
School of Oriental and African Studies, London

2 North America

Brigham Young University Library, Utah
Harvard University Library
Stanford University Library
University of British Columbia Library, Vancouver
University of Denver Library
University of Colorado, Boulder
University of Colorado, Colorado Springs
University of Northern Iowa Library

3 South Africa

Potchefstroom University Library
Pretoria University Library
Rand Afrikaans University Library
Rhodes University Library
Stellenbosch University Library
University of Cape Town Library
University of Natal (Durban) Library
University of Port Elizabeth Library
University of the Orange Free State Library

I should like to acknowledge with gratitude the encouragement and advice given me by Professor Reuben Musiker, University Librarian at the University of the Witwatersrand and supervisor of this dissertation. I wish also to thank Mr Godfrey Thompson for giving up time for me, for arranging visits to numerous libraries in Britain, and for imparting to me much of his knowledge and enthusiasm for library planning and design; and Mr Ralph Ellsworth, who gave me valuable advice on libraries to visit in

North America and was a gracious host during my short stay in Colorado. It has been a very real privilege to meet and come to know two such distinguished authors and consultants in the field of library planning

I am grateful to the University of the Witwatersrand for assistance with travel expenses and for the computer facility which has enabled me to type this dissertation on the word processor Also, to the many librarians too numerous to mention, who made me welcome and spent time with me on my visits to their institutions. I must acknowledge at this point particularly Mr Peter Hoare of Nottingham University Library and Mr Henk de Bruin of the Orange Free State Library who have made available to me photographs of their respective libraries for inclusion in this dissertation

Most of all I wish to acknowledge the love and patience expressed by my family and friends during this difficult period Very special thanks are due to Ian Crowther whose unwavering confidence and encouragement are deeply appreciated

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CHAPTER 1. INTRODUCTION

Prior to the latter half of this century in many countries of the western world libraries were built on university campuses without very much involvement on the part of the librarian. He was provided with a building which it was hoped would last for many years and in most cases although with some drawbacks and inconveniences, it did. During these years librarians saw their job as one of collecting and storing printed material, providing adequate housing for these items and of supplying users with the information they required. Librarianship was on the whole fairly conservative and innovations were viewed with suspicion.

This approach sufficed for many years while universities remained small and the volume of knowledge manageable. However, a number of factors have contributed to a dramatic change in libraries and in the general attitude of librarians and the most important of these is probably what has been termed the information explosion (1). Today more information is being generated than ever before, and it is impossible for a library to contain all the information its users are likely to need. This situation will certainly escalate. South Africa has the added disadvantage of being isolated from the large collections of major overseas research libraries. As numbers of publications and their costs increase the collections of South African university libraries will in all probability become less adequate in terms of research needs and libraries will turn to other methods of supplying information.

Two facts emerge from this situation

1. If librarians are to retain the prestige and respect which they deserve within the context of the university, they are going to have to provide sufficient information to users as quickly as possible.

2. To do this, they are going to have to consider automation. The library of today and of the future, if it is to be cost effective and efficient, is going to have to install computers to gather scholarly information organise it, store it, and deliver it to users Failure to automate will in the long term lead to obsolescence

Branscomb (2) states:

> In our present 20th Century world of print and paper, we tend to think of information in terms of documents In the future our information machines will permit us to enjoy more immediate access to all kinds of information-gathering capabilities Documents will become only occasional by products of information access, not the primary embodiment of it

Technological developments are taking place with great rapidity, and they are already having a profound effect on libraries One doesn t need to take the extreme view that books and traditional libraries will shortly be obsolescent but maybe one should consider the idea that books are a somewhat laborious way of transmitting knowledge that to serve thousands of students many multiple copies are needed, and that the weight of books is reflected in higher architectural costs These are the views of Cornberg, who has been called " perhaps the most radical prophet of the new library technology" (3) There are areas where modern information retrieval techniques may be used to good

advantage not in the provision of basic bookstock for undergraduate students, of manuscripts and rare books for scholars, nor of items for recreation and leisure, but in the rapid supply of scientific bibliographical, statistical and other factual data. In meeting this challenge, librarians will have to make available new and enhanced services.

The changing expectations of library users are apparent in all aspects of library science. Problem oriented research across many disciplines is becoming commonplace. Many users, lacking time and background to search several indexes and abstracting journals in different fields, are relying more on librarians as intermediaries to access and evaluate the literature. As methods of education change so too do the library needs of both teachers and students. The university of today makes use of the new technology as a means of increasing the efficiency of the learning process. These changes will have an effect on library planning and design.

Also contributing to change in library design is the rapid rise in construction, material and labour costs. In South Africa construction costs have risen so sharply that new buildings can cost up to R500 per square metre to construct, and this figure rises to R825 per square metre when fittings, air conditioning and fire protection are included (1). Labour costs have risen with no significant increase in productivity. Thus it becomes more and more difficult to build a comfortable, functional, affordable facility that can house the array of materials and services required in an academic environment.

It can thus be seen that libraries must be dynamic. They are constantly adding more materials and frequently adding new ser-

vices. Those constructed even ten years ago were not built with circulation terminals, online catalogues, computer databases and video equipment in mind. They simply weren't designed and wired to handle the electronic revolution in information technology (5). In planning for the future the librarian is faced not only with a quantitative explosion in the amount of information available, but with a qualitative explosion in the type of materials that are used, the needs they have to serve and the equipment that will enable them to serve new needs. How does today's librarian deal with the overflowing library shelves, the miles of computer printout, and the electronic gadgetry, remembering at all times that his most important function is to anticipate the needs of his patrons? These are problems that will require careful thought. Although it is difficult to predict the future, it is certain that libraries in the year 2000 will be vastly different to what they are today.

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CHAPTER 2. DESIRABLE QUALITIES IN ACADEMIC LIBRARY BUILDINGS

The financial limitations imposed on library expansion in a number of countries since the mid 1970's has meant that in recent years more care has had to be taken in designing buildings that are functional economical and less grandiose than in the past Concepts such as open plan and flexibility are today major considerations in most architects design work and economy both in terms of initial cost and on going maintenance is a control factor which greatly influences the final result Librarians and architects work within strict budgets and the buildings they plan must function efficiently in the broadest sense of the word

The marked effect on library planning of a number of factors has already been mentioned The holdings of the various disciplines are constantly changing in relation to one another, the didactical picture is changing and the nature of the library itself is in the process of constant evolution Although the future is difficult to predict it is certain that greater use of available technology will have an effect on design Thompson (1) states "...a new library must be designed to operate with the materials and techniques of the future rather than the past" Thus a high degree of adaptibility is necessary

Despite differing internal arrangements and library services, recent successful libraries of all sizes have a number of factors in common which have been recognised by Faulkner-Brown, a leading British architect of academic libraries These desirable qualities

have become known as Faulkner Brown's 'Ten Commandments', and each should be carefully considered during the initial stages of planning (2). A library should be:

1 **Flexible**, with a layout, structure and services which are easy to adapt;

2 **Compact** for ease of movement of readers, staff and books;

3 **Accessible** from the exterior into the building and from the entrance to all parts of the building with an easy, comprehensible plan needing minimum supplementary directions;

4 **Extendible**, to permit future growth with minimum disruption;

5 **Varied**, in its provision of accommodation and reader services to give wide freedom of choice;

6 **Organised** to impose appropriate confrontation between books and readers;

7 **Comfortable**, to promote efficiency of use;

8 **Constant in Environment** for the preservation of library materials;

9 **Secure**, to control user behaviour and loss of books;

10 **Economic**, to be built and maintained with minimum resources both in finances and staff.

Flexibility

A flexible library building is one in which structure, heating, ventilation and lighting are arranged to facilitate change. This may be achieved by placing columns at regular intervals, by designing the floors to carry a live load of at least 7 kN/m², and by ensuring an adequate environment in all parts of the building. As far as possible the number of permanent walls within the building should be kept to a minimum preferably confined to certain core areas containing ducts toilets stairs and lifts, all other walls should be demountable. For the most part the building should be open plan. Privacy may be achieved by careful placing of furniture and shelving and with the use of acoustic material on floors and ceilings. If this is done changes may easily be made without having to undertake expensive structural alterations. In addition the open plan library can be economical in staff resources as informal control may be facilitated visually over large areas. At times of staff shortage it is possible for a member of staff to supervise more than one department if they are informally arranged in relation to each other (3).

However as Thompson (4) points out flexibility is both limiting and expensive. In return for the obvious benefits of the open plan layout the architect must provide an ideal environment in all parts of the building at greatly increased cost and he will also find himself restricted in his choice of design solutions. Features such as atriums courtyards and skylights will limit flexibility.

On a more human level flexibility in the hands of less imaginative architects can result in featureless areas which disregard human scale and library functions. Washington (5) believes that flexibility has become the greatest cliche in library design and that those who rush to achieve it may be deliberately avoiding the more difficult task of providing good functional design. If every space

in the library must be useful for every purpose, it is fruitless seeking special building solutions for specific needs Various functional environments have differing characteristics which should be designed into the spaces from the outset Only then will the user receive the best service the student work efficiently and the building be cost effective

Lushington s view is not necessarily in conflict with that of Faulkner-Brown Spaces may be designed for specific purposes yet retain flexibility The successful use of flexible space for the m. y different functions existing in a library is dependent on the ability of the architect and the planning team

Compactness

The most compact form of building is a cube Essentially, travel distances will be reduced to a minimum on entry users are brought to the centre of gravity and books staff and readers will move shorter distances There is also an economy in the consumption of energy (6)

Accessibility

Ease of access to a building and its contents is an important factor The approach should be logical c enient and attractive and this is best achieved by locating the building in a central position thus ensuring that journeys to the library from different parts of the campus are as short as possible The location must be carefully considered in relation to main circulation routes, and to the siting of both present and future buildings on the campus On entering the building the user should immediately be aware of the main elements, e g stairs, enquiry point and catalogues. This should be achieved through design and not an over-proliferation of signs (7).

Extendibility

The principle of the self renewing library, whereby careful weeding of the stock takes place at the same rate as the acquisition of new stock thereby maintaining the library's size at a predetermined level has limited the size of academic libraries in Britain. In general however academic libraries worldwide are built with provision for future expansion This may take place vertically, laterally or downwards Not all are ideal Thompson (8) points out that expansion upwards is likely to cause severe disruption to existing services The library is perhaps the most sensitive of all educational buildings to the disturbances caused by building operations above an existing building which has to remain in use during the construction period Upward extension also requires a heavier and thus more expensive basic structure, and special care in the placing of the core elements Lateral expansion appears to be the most suitable Architects may very easily make use of either demountable partitions for an external wall or precast panels which may be demounted and re used on the outer facade of the extended building (9) Outline plans for future extensions and their relationships to the original building plan should be determined at the time the original brief is prepared, and should be utilised subsequently when the extension takes place At each stage of development the building should be a complete entity (10).

Variety

Users of libraries have many different preferences regarding their surroundings Some are gregarious, others prefer privacy some like a view while others require no visual disturbance at all As much variety of seating accommodation as possible should be provided Not only does this satisfy user needs, but it adds colour and interest to the interior of the library It is not only the

building itself but good furniture design and layout which is necessary for the success of the library in establishing a satisfactory relationship between user and information.

Organisation

A library should be organised in such a way that its services and stock are accessible and easily available. Simplicity of layout is vitally important and planning should be such that there is minimum interference with the main routes through the building of both readers and material (11)

Comfort

The internal environment should be carefully considered. Faulkner-Brown (12) states "A fresh constant temperature and humidity not only promotes efficiency of use it encourages it". It is also necessary to provide a good level of lighting both at the work surface and amongst the bookstacks. Daylight is always an advantage, especially from a psychological point of view, and for this reason reader spaces are often planned around the periphery of the building. It is however important that daylight and especially sunlight should be carefully controlled. General illumination may have to be supplemented by local lighting in some areas e.g. carrels and typewriting rooms where concentrated lighting is needed.

The interior of the library must be so designed as to smoothly, comfortably and attractively serve the needs of its users. It is not enough that a library be functional it is potentially the most civilizing influence on the campus if properly used and its decor and appointments should be a clear reflection of this (13).

In using an academic library, large numbers of patrons will inevitably create noise. Measures should be taken to reduce noise as far as possible, both in terms of design and layout of the library, and in the use of internal finishes. Soft floor coverings coupled with appropriate acoustic correction applied to ceilings combine with bookstacks and furniture to create an environment in which sound levels can be held within acceptable limits by comparatively simple means. Where normal operational sound needs to be masked, electronically generated white sound may be used to create an even balance in the larger spaces.

Constant in Environment

This is increasingly required for the preservation of library materials. Levels of illumination, heating, cooling and humidity should be carefully monitored.

Security

Although security is generally the concern of the librarian rather than the architect, the latter should be aware of the problem when designing the layout of the library. A single exit point controlled by electronic security and open planning to facilitate easier supervision by staff both help to reduce book losses and control user behaviour (14).

Economy

Libraries which require long hours of illumination and air conditioning are expensive buildings to run. Faulkner Brown (15) suggests that attention be given to certain economies such as:

- reducing the area of the external walls and roof so that the ratio of wall area to floor area is low;

- windows, which allow heat to pass easily in and out of a building, should not exceed 25% of the total wall area.

Most energy is required in hot weather when the air conditioning unit has to counteract high outside temperatures, and when the library is being used by large numbers of readers. As Thompson (16) points out, there are two cost factors involved - initial and running. Initial costs are predictable and small compared to running costs which depend on many uncontrollable factors, and which occur throughout the life of the building. Careful attention should be given to mechanical services and the use of maintenance free materials in the building. A brick or concrete wall will cost far less in upkeep than one which is plastered and painted. The initial expense of heavy duty carpeting in areas of dense traffic will prove worthwhile and require replacing less often.

The advantages of incorporating Faulkner-Brown's Ten Commandments in academic library planning need little justification. There are sufficient fine library buildings in existence which have been based on these principles to prove their relevance and value in modern library planning (Nottingham University Library in England, Stellenbosch University Library in South Africa). Despite careful planning, however, construction does not always proceed logically and smoothly. So many processes and details are involved and so much can go wrong that a relatively small percentage of new library buildings are truly successful. In the course of this study a selection of modern library buildings in the United Kingdom, the United States and South Africa have been reviewed, primarily with regard to Faulkner Brown's philosophy. Some of these libraries are very successful, and achieve a rare excellence; others fall a little short of this exalted level. But all are fine examples of careful library planning.

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CHAPTER 3. THE HISTORY OF LIBRARY PLANNING IN SOUTH AFRICA

Van der Riet (1) has identified three stages in the evolution of university library architecture during this century. In the first stage, the library was regarded as a vehicle for the expression of architectural ideas in the grand manner, and considerations of function were not allowed to be unduly obtrusive. The second stage, between the two World Wars, shows a far more realistic assessment of the true functions of a university library and indicates a reaction against some of the extravagances of the pre-World War I styles. The third stage, of which there are many examples in South Africa, is marked by the post-War trend towards greater flexibility in the design of the interior.

Developments in South African library planning have reflected those in countries such as Great Britain, the United States and Australia. In the early part of the Century columned facades, lofty entrance halls, high ceilinged reading rooms and wide staircases were typical features. The original library buildings erected on some of South Africa's older university campuses tend to contain some or all of these features e.g. the J.W. Jagger Library at the University of Cape Town, and the William Cullen Library at the University of the Witwatersrand. Rhodes University and the University of Natal in Durban initially housed their libraries in clock towers in an attempt to bestow status on this important aspect of higher learning. In all cases these early locations have been supplemented by additional buildings or space replaced by new buildings, or else extensive alterations have been made to their interiors. Librarians all too often found themselves starved for floor space, limited by rooms of permanently fixed size

and arrangement, and deprived of the opportunity for expansion (2).

Since 1945 a number of factors have caused revolutionary changes in library design. Construction costs rose, student numbers increased considerably, and libraries could not provide sufficient space and services. It was necessary that they become more functional, especially as funding was rarely increased to a sufficient degree to meet rising costs. Librarians, university planners and architects alike realised the importance of farsighted planning in the form of internal flexibility and provision for expansion. The changes that took place at this time may be summarised in the words of Macdonald (3): "The best libraries are now built primarily to serve readers rather than to impress them. ... Some of the money saved in eliminating unnecessary architectural embellishment was well spent in adding to the comfort of readers."

The histories of South African libraries have been written by others (Immelman, Freer, Van der Riet), and it is not the purpose of this study to repeat what has already been said. However, five university libraries will be discussed briefly from the point of view of their physical planning in order to illustrate the development of academic libraries in this country.

The University of Cape Town Library

In October 1829 the founders of the South African College, forerunner of the University of Cape Town, appealed to the people of Cape Town for "... any donation of Classical, Instructive or Amusing Books ..." (4). This initial collection grew slowly over the years, beset by financial difficulties and relying on the generosity of the citizens of Cape Town. In 1840 the South African College erected the so-called Egyptian Building, the first building for higher education in the country, at the top of Government Avenue

in Cape Town. The plans for the building made provision for the inclusion of a library and museum room (5), although no main College library collection existed as such during these early years. 1905 marked the first important step in the history of the Library, with its formal establishment in the dining room of the Registrar s office. Under the care of Professor Logeman, Head of the Department of Modern Languages and Honorary Librarian from 1905 to 1920, books scattered in various departments were brought together, arranged systematically and catalogued. The real beginning of the College Library, as contrasted with a fortuitous collection of books, dates from this year (6).

The College expanded rapidly. Hiddingh Hall was completed in 1911 and the Library was accommodated on the ground floor. Although it had a mediaeval appearance, which Maple (7) ascribes to its meagre proportions and gloomy teak alcoves, for the first time the collection was located in an area especially designed and built for the purpose. In 1916 the University of Cape Town Act was passed, and planning of the new campus at Groote Schuur began. Solomon was appointed architect, and he produced a plan of beautiful simplicity. Three major terraces on the side of the mountain for playing fields, residences and tuitional buildings were linked by a grand flight of steps leading to the focal building at the top, the assembly hall (8). Although only the outline of the proposed library building was shown, it was given an ideal site immediately to the left of this hall. The building, which is named after J.W. Jagger, benefactor of the University, was occupied in early 1931. Immelman (9) describes the building as being larger than anything provided for library purposes in South Africa up to that time.

> "The main reading room is a large, nobly proportioned hall, the centre of which rises sheer to third storey height and which is supported on eight columns along two sides of the

> hall. Down the sides behind the columns there are galleries... At the back of the building there are stackrooms on four floors".

In addition, six small seminar rooms were provided, and a large basement housed extra storage space for books as well as staff offices.

By 1944 an extension had been added to the Jagger building. This was a difficult task as the original building did not have any space around it for expansion, it was located on a steep mountainside, and the building itself was very inflexible internally. Integration of old and new buildings presented problems, and the result has always been unsatisfactory from a functional point of view. By the early Seventies the Library had once again outgrown available space and the situation had become critical. Measures were taken to ensure that optimal use was made of existing buildings, a series of mezzanine galleries was added, as were annexes and a building occupying semi-underground space between the Library and a neighbouring building. At this stage the University Planning Unit proposed the idea of linear library development, as used in the planning of Bielefeld University in Germany and the New University of Ulster in Northern Ireland. The basic concept is that while the Library's administration and main services remain centralised, a library continuum or spine reaches out to place the bookstock as close as possible to the teaching departments (10).

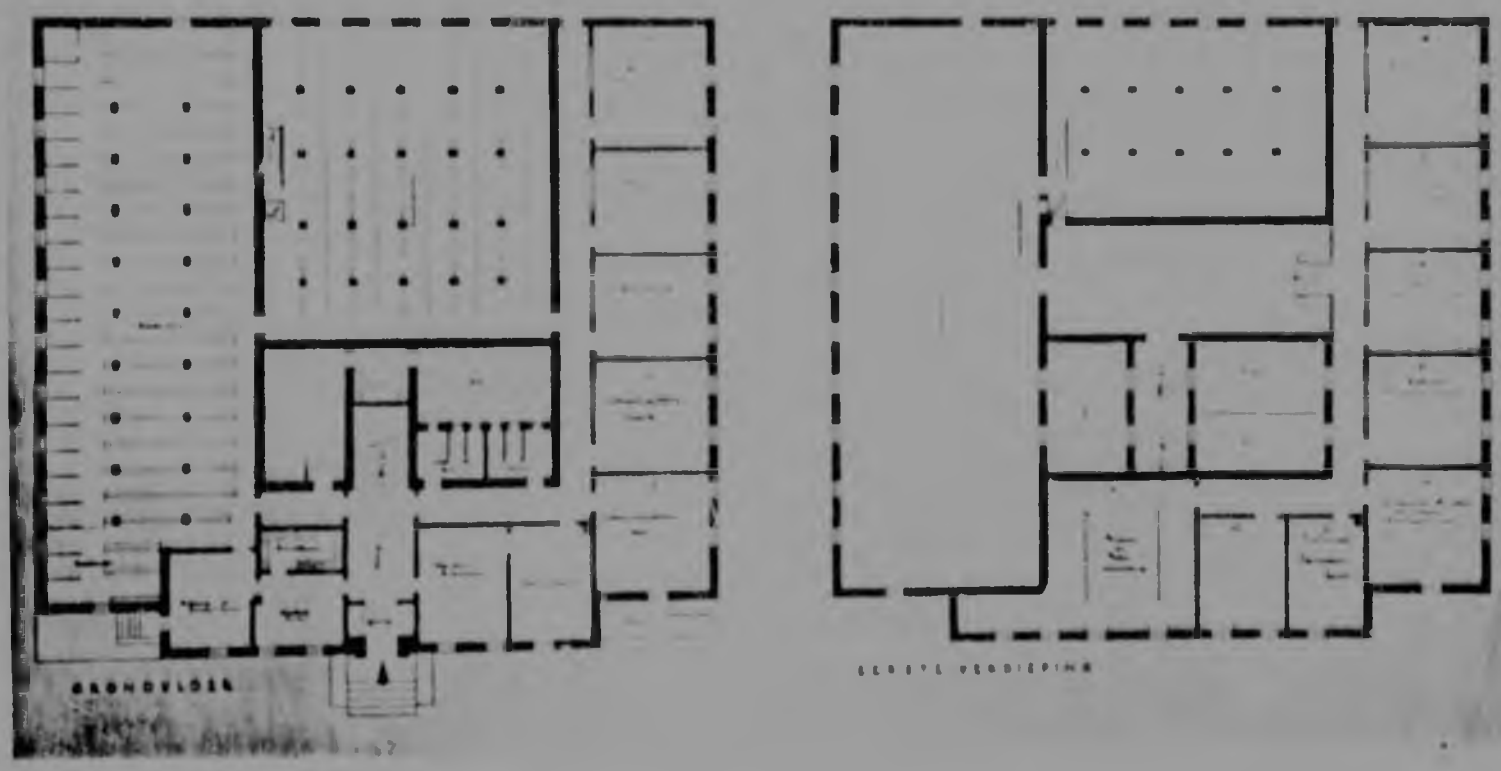
This policy has been implemented at the University of Cape Town over the past decade. The concept of the linear library will be discussed more fully in Chapter 15.

The Stellenbosch University Library

Stellenbosch University Library traces its origins back to 1884, when a contribution made by its Junior Debating Society enabled the Stellenbosch Gymnasium to establish the beginnings of a lending library. During the time it was known as the Victoria College (1887-1918) the Christian Marais Library (1900) was founded and became the first separate university library building in South Africa (11). It comprised a large hall containing oak bookcases and tables for readers, with library staff separated from public areas by shelving. In 1925 the building was extended by the construction of a concrete slab between the floor and the high ceiling, thus doubling its size. This building served until the end of 1938. In 1939 the Library moved into the attractive new Carnegie building (12).

Floor plans of the Carnegie library have been included (see Fig 3.1) in order to illustrate the marked difference between the fixed function library of 1939 and the modern, flexible library of 1983, discussed in Chapter 5 of this study. The layout of the original library consisted of administrative and processing offices on the ground floor, and twenty individual study carrels in close proximity to the bookstacks. As was accepted form at the time, the reading room was large and separated from the bookstacks - in this case situated on the floor above, and occupying the whole length of the northern side of the building. The reading room contained parallel rows of study tables, could accommodate two hundred students, and was thought to have a calm and peaceful atmosphere (13). Natural light entered through the north facing windows, and artificial light was provided by fourteen hanging lights and individual table lamps. Current journals were displayed on wall shelving around the reading room.

Fig. 3.1 - Carnegie Library, Stellenbosch University: Floor Plans



(Source: MARAIS, G.V. Die Carnegie Biblioteek van die Universiteit van Stellenbosch, 1939 1954 *South African Libraries*, vol.22, 1954 p.49).

Thirteen large seminar rooms were provided in the Library, initially for the use of post graduate students. They were separated from the rest of the Library by a wide passage, and could be used when the rest of the Library was closed. Needless to say, many were eventually taken over for other purposes as the Library grew in size.

By 1953 it had become necessary to extend the Library. As had been envisaged, this extension took place at the back of the building on the east side, and involved breaking through from the existing building. It increased the size of the Carnegie building by about one third, with the intention that it would provide sufficient additional space for the next twenty years (14).

In December 1983 Stellenbosch University Library moved into its new central building located under the Jan Marais Square in the heart of the Campus. This innovative and extremely functional library is outstanding in many ways and will serve the University well into the 21st Century, the gracious Carnegie building has been taken over by academic departments.

Rhodes University Library

St. Andrew's College, established in Grahamstown in 1855, became Rhodes University College in 1904, with the Library housed in a single room in the tower of the original Drostdy building. In these early days of its existence the Library received many valuable gifts, and it was due in part to these that the problem of accommodation shortly became acute. Currey (15) describes the solution:

> "Immediately west of the original Barrack building, there stood one of the rambling post Jameson Raid, pre-Boer War bungalows which had formed the original home of the De-

partment of Botany. It was of red brick under corrugated iron, squat, hideous"

There, despite inconvenience and discomfort, the Library remained for some twenty years. In 1936 the central portion of the Main Block was built, and the first floor of this building was allocated to the Library.

The College achieved University status in 1951, and it was not long afterwards that the planning of a new library building began. The site chosen was ideal, at the focal point of the Campus and centrally placed in relation to many academic departments and student residences. It was planned on a modular basis. Van der Riet, Librarian at the time, was aware of the need to provide for expansion and for the possible rearrangement of the internal spaces, and it was required that flexibility be incorporated into the building. Anticipating growth, the design made it possible for the addition of a further floor.

The Rhodes University Library was completed in 1960, and was planned to last until the 1990's. However, it was critically short of space by 1980. Although the planning team correctly predicted a slow growth in student numbers, it misjudged the rate of growth in the bookstock. What was a large, spacious library in 1960 is presently overcrowded and uncongenial, and although flexibility was intended, the building has not adapted well to changing needs (17):

- the central service core restricts flexibility and reduces the size of usable areas;

- the existing basement is only half the size of the other levels, due to financial cutbacks during construction;

- because the Library is built on clay, and because the basement is not as large as the rest of the building, it is not possible to add a floor on top of the Library in order to extend it, as was originally envisaged

Some years ago a plan to extend the building was considered. However, financial constraints have made this impossible, and the present librarian has the unenviable task of trying to improve conditions with no space and little financial support. It appears that the situation could be greatly alleviated were a store to be found for lesser used material on the outskirts of the Campus. This would go a long way towards reducing the obvious overcrowding in this Library, and improving general conditions for both Library staff and users.

The University of the Witwatersrand Library

The University of the Witwatersrand, with its origins in the South African School of Mines, Kimberley (1896), achieved autonomy as a university in 1922. The Library was initially housed in a room in the Central Block, the main building on the Campus. Tragically, this flourishing library, which contained rare items of Africana, was destroyed by fire in 1931. Planning immediately began on a new library building, which was officially opened in March, 1934, and which was later named after William Cullen, patron and friend of the University Library (18). Freer (19), Librarian at the time, outlined the planning of this library, describing for the first time in this country the use of standards for library buildings (20).

The site of the William Cullen Library was well chosen. It was accessible, had attractive surroundings, capacity for expansion, good natural light on all sides, and the land sloped towards the rear of the building, providing an ideal location for a delivery entrance and permitting natural light to enter the basement

stackrooms. The building is of reinforced concrete construction, with precast concrete blocks in imitation of stone being used for the external surfaces (see Fig 3.2). Space was allowed for an increase of five hundred percent in the size of the bookstock. However, even at this time (1934) Freer was giving thought to a central store for lesser used books, and also quotes Randall's viewpoint that "It is distinctly possible that there is a maximum limit beyond which no college ought to go in the size of its library collection" (21). Both these solutions to space problems are very much in vogue today, some fifty years later.

Seating was provided for 25% of the student body in accordance with the Carnegie Corporation's recommendations. Ceiling height was a multiple of seven feet so that stacks and galleries could be readily installed. It is interesting to note that although libraries built at this time are considered to be fixed function, the planners of the 1930's were consciously attempting to create open plan libraries, with the desk, catalogues, reading room and shelving occupying one large open space, and under this at basement level, the bookstacks. An attempt was made to limit as far as possible the number of columns in the main room (there are four); to have as few structural walls as possible, to keep the plan of the building as simple as possible, and for rooms and offices open to the public to be easily and obviously accessible (22).

The main reading room has clerestory windows on all four sides, supplemented by fourteen high ones on the north and south. The bookstacks are located immediately below the reading room in three basements. As regards furniture and fittings, standards were applied that are in many cases still effective today. Height of stacks was such that a person of medium height could reach the top shelf, shelving was adjustable and in 3 ft. lengths, study tables were a multiple of 2 ft. 6 ins., 30 sq. ft. per reader station

was allowed, while staff space was calculated at 100 sq ft per staff member

By the 1960's there was insufficient accommodation, despite expansion into an adjacent prefabricated building The unfortunate result of this was the growth of departmental libraries However, the William Cullen Library served as the central library until 1972, when the undergraduate Wartenweiler Library was opened. It was proposed that the new building together with the existing library should provide for the University's library requirements for the next twenty five years

The Wartenweiler Library is a rectangular block consisting of five levels above ground and a basement below with a gross area of approximately 12 000 m^2 Although modern in its design the building does have a few major disadvantages Flexibility is reduced by the permanent structure of a number of advanced study rooms for postgraduate students on the top floor and by the large service core running through the building which effectively cuts it in half The entrance foyer on the ground floor is bleak and unattractive However modular planning and internal flexibility in most other areas have allowed the building to adapt to changing needs to a reasonable degree This has been further facilitated by a good system of lighting full air conditioning, and an ideal module size of 6.9 m

The future of the University of the Witwatersrand Library will involve provision of library services on two halves of a greatly enlarged campus divided by the M1 freeway when the University moves certain faculties onto the West Campus site in 1986 It is envisaged that a new central library will be built on the West Campus in the 1990's, while the Wartenweiler Library will continue to serve the existing East Campus The William Cullen Library

will remain a research library, housing the Africana, Government Publications, Reference Manuscript and Early Printed collections.

The University of Pretoria Library

The origins of the University of Pretoria go back to 1908, with the establishment of the Transvaal University College. In 1911 the College moved to the present campus where it occupied a small, attractive sandstone building known as the Arts Block (23). The Library was located on the second floor and contained a number of large ornamental bookstacks. Shelves were added regularly to accommodate the growing collection and it was not long before the hall was full. In 1928 it became necessary to incorporate an adjacent classroom as a reading room and shortly thereafter another (24). By 1925 there was pressure on the University authorities to build a new library, and many years later, in 1939, this became a reality. In designing the library, the architect, Moerdyk, strived to create what he hoped would become a typically South African architectural style, based on that of the old temples of Egypt (see Fig 3.3). However, as far as internal design was concerned, the principle characteristics were similar to those of other libraries of this period.

Moerdyk's original plans proved too costly, and various compromises had to be made with the result that although the requirements were met, the scale was smaller than was desirable - 1 570 m^2. However, this did not detract from the fact that the library was a compact building with a high degree of comfort. It was built on three levels, the large stackroom at basement level being separated from the reading room at ground level. The first floor contained an exhibition hall and six seminar rooms, which were later utilised in general library expansion. This original library, named after the Merensky family, served the University of Pretoria well for many years.

Shortage of space inevitably led to the construction of the first extension in 1957, and a large new building was completed in early 1975. The latter is an attractive, modular building well designed for the various library services and functions taking place within it. The Library as a whole now covers 11 390 m^2. With the first extension the monumental element disappeared the building was constructed on a much more functional basis. However, it was only with the advent of the 1975 extension that the University of Pretoria achieved the dynamic outgoing character necessary in a modern university library (26).

The development of academic libraries in South Africa reflects the growth in awareness of the importance of long term planning, seen not only in provision for expansion but in modular construction, internal flexibility and functionalism. Two examples of progressive library planning in this country will be discussed later in this study: the libraries of the Universities of Stellenbosch and the Orange Free State.

Although these aspects are of prime importance, libraries should not necessarily be functional to the exclusion of all else. Although very few librarians regret the passing of monumentality, the library should remain a symbol on campus, signifying its importance in academic achievement. It should be efficient and comfortable within, yet finally it is more than bricks and mortar; it is an instrument of education. Beauty and practicality are not incompatible. On the contrary, they are frequently combined with a large measure of sucress, and it is this combination which university library planners and architects should try to achieve.

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Fig. 3.2 - William Cullen Library, University of the Witwatersrand

Fig. 3.3 - Original Merensky Library, Pretoria University

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CHAPTER 4. SOUTH AFRICAN UNIVERSITY LIBRARY SPACE STANDARDS

Although certain norms were applied in library buildings prior to 1979, there were no space standards as such which could be used as guidelines by university planners and administrators. The Department of National Education decided to institute the South African Post-Secondary Education Information System (SAPSE) in an attempt to provide institutions of higher education with a methodology for effective planning and itself with the necessary information for realistic financing of these institutions. Based on an American system known as *Higher Education Facilities Planning and Management*, the SAPSE system deals with many aspects of university planning such as finance, fixed assets, degree classification and student admissions.

Background

The Universities Advisory Council (UAC), which had been established in 1976, required that certain data be readily available. At the time, the Department of National Education had an information system which, in terms of the UAC's needs, had four serious faults:

- in some instances it contained too much information which served no purpose at a national level;
- other important items of information did not appear, e.g. building space.

- it was not an integrated system i e it was not possible to take one aspect and follow it through in terms of finance, value of fixed assets and space occupied,

- it was limited to universities for Whites It had become clear by this time that both the State universities and the technikons and colleges of education must be taken into account when planning universities

Thus the national information system needed reconsideration. Systems in a number of countries were studied and the American one was found to be most adaptable to local conditions The different components were developed locally by groups of experts drawn from the universities themselves and the mandate given to the working groups was that although it was to be a national information system all classification structures should be such that they could be utilised positively within the universities themselves The resulting manuals were issued initially as review editions and input from the various universities has been encouraged in an effort to establish the most acceptable system possible

Although buildings do not represent the most important resource of a university they play an important role in achieving the purposes of higher education Good planning and management of this resource is of significant value because

- buildings house the educational and research programmes of universities and the amount of space available may define the activities to which the institution may commit itself

- physical facilities consume most of the university's capital expenditure and a portion of its operating expenditure.

- acquisition of buildings represents a major commitment of financial resources;

- buildings are a highly visible resource and may strongly influence an institution s image (1)

A building and space inventory also provides useful information for purposes such as

- scheduling and assigning space

- allocating and analysing the use of resources, and planning future resource needs

- comparison of data with those of other institutions,

- the evaluation of university space requirements at national and provincial level for purposes of fund allocation (2).

In the past, standardised procedures were typically based on extensive analysis of historical data and from these national averages were derived Against these data from individual universities were compared and evaluated However the use of averages masks individual differences and assumes that these variations around the average are invalid In order to overcome these deficiencies, it was decided to construct a planning system on the basis of what is desirable and necessary rather than on what is or has been

Building and Space Information

SAPSE consists of a series of manuals It is those relating to space and buildings which have a direct effect on the planning of library buildings at universities They are

1. Manual 009 *Building and Space Inventory and Classification Manual*, which is a local adaptation of the *Higher Education Facilities Inventory and Classification Manual* (Western Interstate Commission for Higher Education (WICHE), Boulder, Colorado United States Department of Health, Education and Welfare 1974) It is concerned with the classification systems and definitions necessary for describing and quantifying buildings and space in terms that are meaningful for planning and resource allocation

2 Manual 101 *Nation Wide Space and Cost Norms for Buildings and Land Improvements other than Buildings*, which is an adaptation of part of Manual VI of the series *Higher Education Facilities Planning and Management Manuals* (WICHE Boulder, Colorado United States Department of Health, Education and Welfare 1971) It describes a system of space and cost norms, based on detailed student numbers which will assist in providing a basis on which requests for funding may be more easily evaluated and funds allocated in an equitable way (3)

The provision of much of the data for reporting purposes lies outside the sphere of responsibility of the librarian However, for planning purposes it is as well for him to be familiar with the procedures involved and the way in which library space is analysed In terms of the total SAPSE system the programme under which the library falls is 4 0 *Academic Support:* sub-programme 4 1 *Library Services*

Classification of Space

In analysing the space within a given building three area measurements may be determined

1. Gross area - the sum of all floor areas of the building based on exterior dimensions.

2 Assignable area - the sum of all the area in all rooms that may be used by the occupants to carry out their functions

3 Non assignable area - the sum of circulation custodial mechanical and structural areas

It is the assignable area that may be further classified into categories according to space use for analytical purposes The floor area of each room is measured in assignable square metres (ASM) In terms of SAPSE space categories the assignable space in a library consists mainly of office space (category 4 code 300) and study space category 5 code 400) A breakdown of these categories is as follow.

Category 4 - Office Space

- 310 - Office a space used by staff or students working at a desk

- 315 - Office Service space directly serving an office e g duplicating room

- 350 - Conference space serving an office complex and used primarily for staff meetings

- 355 - Conference Service space serving conference space e g projection room, kitchenette

Category 5 - Study Space

- 410 - Reading Study space used by individuals to study

- 420 Stack space used to provide shelving for library materials.

- 430 Open stack/Reading room combination of reading and stack space generally without boundaries between the two types of space

- 440 Processing space serving reading study or stack space as a supporting service e g catalogues circulation desk

- 455 Study service space which directly serves the above spaces e g cloakrooms, lockers (4)

Where there is doubt allocation to a space category should be done on the basis of dominant use e g academic staff study rooms in libraries are coded 410 However if an academic staff member has been assigned such a room as his main office the space is 310 Librarians should note too that included under Library Services (4 1) are also decentralized library services and organised collections in departments, cataloguing and indexing services separate from library collections and the provision of study areas separate from the library It is thus important that the librarian ascertains what space on campus is recorded under 4 1

The SAPSE space norms are based on present or projected numbers of full time equivalent (FTE) students In calculating space for a proposed library building it is necessary to obtain the projected FTE student number for a specific year in the future from the university s administration This figure is multiplied by the SAPSE space norm and the result is the area permitted by the SAPSE system for the proposed library Existing building space also has to be tested against the norms, with the re-utilization of space if necessary to ensure as far as possible conformity within the SAPSE requirements (5)

Table 4.1 - SAPSE Norms for the Calculation of Study and Stack Space

The ASM reading study space per study station (A), the annual utilization hours per study station (U), the annual student study space contact hours per FTE student of a particular aggregate of course levels (C), the ASM stack space per bound volume (S), and the number of bound volumes per FTE student of a particular aggregate of course levels (V)

Course Levels*	A (ASM)	U (Hours)	C (Hours)	S (ASM)	V
2 - 5	2,5	800	200	0,009	60
6	2,5	800	200	0,009	120
7 - 0	2,5	800	200	0,009	180

*Course levels

Levels 2 - 5 Undergraduate
Level 6 Lower Postgraduate (Honours)
Levels 7 - 0 Masters and Doctoral

(Source: *SAPSE 101*, 1982) p 2-15)

Space Norms Applicable to Libraries (6)

Office and Conference Space

When planning new buildings the norm for office and conference space is multiplied by the anticipated number of FTE students for the year for which the building is being planned. The norm is expressed in the following formula:

$$\frac{B}{R} = \frac{\text{ASM allowed FTE staff member}}{\text{FTE students FTE staff member}}$$

$$= \frac{15 \text{ ASM FTE staff member}}{65 \text{ FTE students FTE staff member}}$$

$$= 0{,}213 \text{ ASM FTE student}$$

This is a comprehensive norm for all office and conference space. To assist planners the norm 15 ASM FTE staff member should be utilised within the overall area allocation. Libraries may use the area available according to their individual requirements e.g. more space may be given to tearooms and conference rooms and less to individual offices.

Reading Study Space (Refer to Table 4.1)

The norm is expressed in the following formula:

$$\frac{A \times C}{U} \quad \frac{\text{ASM Study station} \times \text{annual contact hours FTE student}}{800 \text{ potential Annual contact use-hours Study station}}$$

$$= \frac{2{,}5 \times 200}{800}$$

= 0,625 ASM FTE student

This norm is applicable to all study levels Provision is made within this norm for study stations for twenty five percent of the FTE student number, with an average of 2,5 ASM station.

In planning new buildings 0 625 ASM is multiplied by the projected FTE student number for which the building is being planned, and this provides the area permitted in terms of SAPSE for study space In South Africa, librarians are concerned that within this norm insufficient thought and provision have been given to the use of audiovisual and computer equipment Although present usage of this type of equipment is relatively low it is likely to increase greatly in the near future and librarians could find themselves without enough provision for study space

Stack Space (Refer to Table 4 1)

The SAPSE space norm may be expressed by the following formula:

S x V ASM Stack space bound volume x number of bound volumes FTE student

with the following values and norms per course level

Table 4.2

Course level	Values	Norms
2 - 5	0 009 ASM volume x 60 volumes	0 540 ASM FTE student
6	0,009 ASM volume x 120 volumes	1 080 ASM FTE student
7 - 10	0,009 ASM volume x 180 volumes	1,620 ASM FTE student

The planning criterion of 0 009 ASM bound volume is used with the recognition that it implies a mix of library resources. For planning purposes it is necessary to give the projected number of FTE students *per course level* and to multiply these figures by the norm. The result will be the area for bookstacks permitted by the SAPSE system.

The linking of the norm for stack space to FTE student numbers has been questioned by librarians. This enables a university library to reach its SAPSE limit either because it has a collection which has been built up over many years (the older residential universities) or because student numbers have stabilised. In either case a zero growth situation may arise. As the national bookstock is not necessarily sufficient both qualitatively and quantitatively the wisdom of restricting the growth of university libraries in this way is debatable (7).

Processing Space

This type of space includes catalogues, circulation desks and storage areas for audiovisual equipment. The norm is calculated as 7% of the sum of reading and stack space.

Table 4.3

Course level	Reading ASM	Stack ASM	Total reading + stack	Norm-ASM FTE (7% reading + stack)
2 - 5	0,625	0,540	1,165	0,082
6	0,625	1 080	, 705	0,119
7 - 10	0,625	1,620	2 245	0,157

To determine the space required for processing in a proposed library, the projected FTE student number *per course level* is multiplied by the norm. Bookbinding is sometimes included in processing space, but may also be classified under 'Workshop' space, in which case it should not be included in library space. Space allocated to processing functions varies enormously from one library to another. Flexibility is permitted as long as the overall norm is not exceeded.

Overall Space Norm

When planning new libraries, the overall norm for library space may be utilised in order to provide the architect with the total permitted surface area. This allows him flexibility in the sub division and application of space according to the librarian's requirements.

The global norm, inclusive of office space, is as follows:

Table 4.4

Course level	ASM FTE student
2 - 5	1,478
6	2,055
7 - 10	2,633

Any building will have assignable space and non assignable space. SAPSE norms are applicable only to space in assignable square metres i.e. office, reading, stack, service and processing space. The layout of library space and the percentage ASM allocated to each space type is left to the individual librarian, with the proviso that a) the overall ASM's do not exceed the norm, and b) an at

tempt is made to maintain a ratio of 80% assignable space to 20% non-assignable space.

Comments

The positive aspect of space norms is that they allow the planner to work within finite parameters which makes his task somewhat easier. But standards do not really make provision for the wide variety of needs within libraries. Many volumes require more space than 0,009 m^2, some staff members require larger offices than 15 m^2, especially if their jobs require interaction with equipment. Automated equipment also results in larger user work stations e.g. a person working with a microfiche reader or television monitor requires more space than one working with a book. For the new technologies standards tend to be less than applicable (8). Although the SAPSE norms are supposed to be formulated so as not to infringe upon the autonomy of the institution concerned, the authors do admit that they are conservative (4).

Many of the criticisms levelled at the space restrictions imposed on university libraries in the United Kingdom by the University Grants Committee, discussed later in Chapter VI, may also be applied to the SAPSE system in this country. Any system which limits the size of a library in terms of space and consequently in terms of stock will ultimately have grave consequences for university library services in South Africa. Although the Department of National Education does not use the term 'self renewal' at any stage in the SAPSE manuals, the concept is implicit and should be recognised. Any university library which has its size determined by the number of FTE students registered with the institution is bound to find ultimately that the growth in the stock exceeds growth in student numbers and that a critical point in terms of space (or will be) reached. At this stage there is likely

to be little choice but to remove lesser used material from the library to storage

The concept of a cut off point for stock cannot be sustained in South Africa, with its obvious local disadvantages for the research worker. Firstly there is the problem of distance from the sources of book supply and from the great library collections of Europe and the United States and also the distances between libraries within the country. Secondly there is a lack of supplementary library facilities on any worthwhile scale. South Africa does not have numerous large and well stocked city libraries nor does it have the equivalent of the British Library or the Library of Congress. Thus the imposing of restrictions on size by the Department of National Education could create problems within the academic community.

Although much may be gained from a library that is limited to containing those items actually used, and which does not bewilder a prospective user with shelf upon shelf of needless material, librarians in South Africa must look at the total resources of the country in terms of research. If most of the resources a research worker needs cannot be obtained relatively quickly and easily from his own or nearby libraries enormous frustration will result, and it is in this important area that South Africa suffers an isolation unknown to the European or American researcher.

An academic library is the right size when, if it were any bigger, there would only be an increase in the quantity of unused books in it, and if it were any smaller, the borrower would find it too frustrating to use (10). Possibly the right size in South Africa has of necessity to be somewhat larger than that accepted as adequate in first world countries. Unfortunately the SAPSE space norms will counteract this development.

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CHAPTER 5. STELLENBOSCH UNIVERSITY LIBRARY

Architects	Interplan (Cape Town)
Engineers	Breinette Kruger and C A. du Toit (Cape Town)
Floor area	15 800 m²
Book capacity	700 000
Reader stations	1 350
Cost	R12,5 million
Completion date	November 1983
Librarian:	F du Plessis

Site and Access

The Architects were commissioned by Stellenbosch University to design a new library which would replace the old Carnegie Library and centralize the many library activities at that time spread across the Campus. Siting the new library was a problem as there was no available space on the Campus and the town of Stellenbosch has to all intents and purposes reached a stage of zero growth. It is surrounded by agricultural land and is unable to grow much beyond its present limit. Consequently it was initially suggested that the existing Library building be demolished and a new building constructed in phases so as to ensure continued operation of library services. However the sheer size of the building required by the university was not compatible with the scale of the Jan Marais Square, which the Carnegie Library overlooked, nor with the size of the surrounding low-rise buildings. The Jan Marais Square nevertheless does form the demographic, logistic and visual focal point of the Campus (see Fig. 5.1). The surrounding buildings, although of differing architec-

tural form give it a distinctive harmony and character. Perhaps most importantly the Square is within seven minutes walking distance of all teaching departments on the Campus.

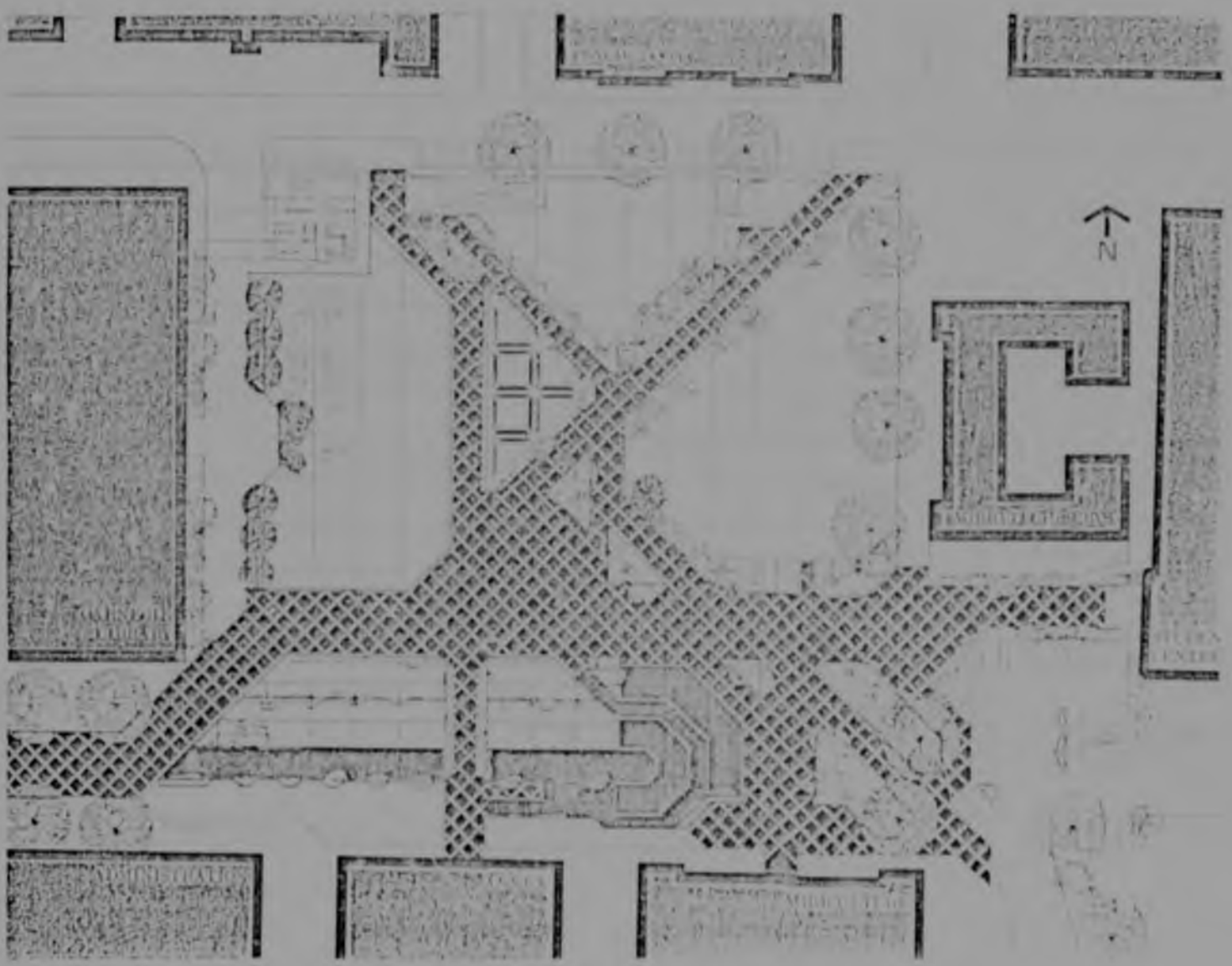
It was thus decided that this area would be the logical answer to the site problem and alternative design strategies were considered. The solution finally submitted to the University was to build the Library on two levels underground beneath the square. This would retain all the buildings facing the Square including the Carnegie Building and it would also retain the central open space. Although radical in terms of South African library design, this solution solved the University's problem of site, met the Library's need for maximum contiguous space and also provided ample room for expansion.

The Architect's Brief

This was prepared by Aucamp (1), Deputy Librarian at the time, in 1971. The Library was to form an integral part of the total research and study facilities offered by the University. The previous Library system consisted of a central library (the Carnegie Library), four branches and nineteen departmental collections, for the most part administered centrally. It was hoped that in terms of efficient service and costing the new building would bring about a rationalization of library services and a reduction in the number of departmental libraries. A system of subject librarians would hopefully encourage this. In the *Brief*, the Architects were given details of Faulkner Brown's desirable qualities for a library building: flexibility, compactness, variety, comfort, accessibility, expandibility, organization, security and function, and were expected to meet these in their proposed plan.

After discussion with the Librarian and University planners, the Architects decided on the following major design objectives:

Fig. 5.1 - Site Plan, Stellenbosch University Library



- to satisfy the stated needs of maximum contiguous space, a high degree of flexibility, and a totally modular plan;

- to design a library in accordance with the latest library design philosophy i e organised on the basis of a number of subject libraries housed in a single building with centralized library services;

- to provide a service infrastructure to cope with present and future needs for audiovisual material, computerization and other technological advances;

- to create an environment conducive to study as well as relaxation with particular care being taken in the creation of a psychologically acceptable subterranean building;

- to create space of such quality as to improve the frequency of use of the library;

- to design an energy-efficient building;

- to design a civic space of quality retaining the integrity of the Square.

Engineering Requirements

These are of particular interest in an underground library The contract engineers (3) conducted a ground investigation of the area in mid-1980, and found that although ground water was present, underground construction was possible if certain preconditions were met

- that the external walls should be as impermeable as possible to ensure the greatest degree of waterproofing;

- to satisfy the stated needs of maximum contiguous space, a high degree of flexibility, and a totally modular plan;

- to design a library in accordance with the latest library design philosophy i e organised on the basis of a number of subject libraries housed in a single building with centralized library services;

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- that the external walls should be as impermeable as possible to ensure the greatest degree of waterproofing;

- module size should be optimal both from a library planning and a cost point of view,
- surfaces should be as inexpensive as possible without affecting mechanical services,
- the construction should be simple
- the building should be serviceable as regards likely user needs.

1. **Waterproofing**

The prime consideration of an underground building is that it should be absolutely waterproof The walls of the Library consist of three layers an outer layer of durable damp-proof material an outer wall 200 mm thick of waterproof reinforced concrete, separated by a space from the inner wall. The space enables any water entering the area to be drained off Regarding the foundations an underground drainage system has been constructed to ensure that there is no pressure on the floor Above this system is a durable waterproof membrane which adjoins the walls and which is covered with a 50-75 mm. layer of gravel On top of this is a layer of waterproof concrete, on which the columns stand There is then a layer of loose rough brick followed by another waterproof membrane, and finally the concrete floor The columns themselves are set in trays and are carefully protected from damp

Above the 400 mm thick waterproof roof is a durable waterproof membrane attached to the walls This is covered with a 75 mm layer of gravel to protect it The roof is built with a slight downward slope from the centre (1 200) to facilitate drainage All water drained from the outer surfaces

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Above the 400 mm. thick waterproof roof is a durable waterproof membrane, attached to the walls. This is covered with a 75 mm. layer of gravel to protect it. The roof is built with a slight downward slope from the centre (1:200) to facilitate drainage. All water drained from the outer surfaces

of the building is led via gravitational piping to the pumphouse, from which it is pumped into the general storm water system. A reserve pump is provided, which starts automatically should the main pump fail (4).

2. Air Conditioning and Ventilation

The underground construction of two large spaces creates certain unusual aspects. The influence of daily and seasonal temperature changes is reduced to a large degree. The building reacts very slowly to any change, and sudden changes have no effect whatsoever. The costs of cooling are thus low, and are estimated at a third to half the costs of a similar building above ground. The building is thus efficient in terms of energy consumption, and low running costs are expected. The air conditioning system dissipates the heat build up caused by the presence of people and lighting in the large internal areas, making use of cool outside air whenever possible.

3. Central Vacuum System

A central vacuum system has been installed for cleaning purposes which has a number of advantages over the traditional method:

- it is quick, with the result that less cleaning staff are required;
- all dust is transported in pipes to the machine area;
- noise level is low;
- on going costs are reasonably low.

- no storage space is necessary for equipment;
- the system has a long life

Outlet pipes are located on columns on a level above the height of the bookshelves. They will thus not influence any changes in the location of the stacks and flexibility will not be affected.

4 Lift Installation

There are two lifts in the Library. One is for passengers and book trolleys travelling between the two floors and is located centrally. The other is a goods lift, used for transporting equipment and parcels from ground level to the lower levels. Because lift engine rooms above the lift shafts at ground level were not desirable, hydraulic lifts have been installed. The engine rooms are located alongside the lifts and are fitted with soundproofing to lessen noise.

5 Power Network

The electrical power supply to the new library is contained within the existing cable network of the Campus. An emergency power supply has also had to be supplied for lighting and ventilation purposes, so that activity in the Library can continue during a power cut. Special care was taken with the lighting system to facilitate the flexibility required in the open spaces. The continuous single tube 1,5 m² light armatures are suspended from the ceiling, the pattern consisting of a square within a square, repeated throughout the reading stack areas (see Fig. 5.5). Shelving may thus be placed at any angle without reduction in level of illumination.

A bell system has been installed to announce closing time, and clocks are placed at strategic intervals. A master clock with a number of slaves is used so that all show the same time.

Flexibility

The *Brief* stated that the internal planning of the building should make provision for growth and possible rearrangement of areas to provide for future needs. Modular planning was recommended. In response to these requirements the architects investigated various module sizes. In terms of cost there was found to be very little difference between them, and it was thus decided that the best module size from the point of view of library planning should be used. Bays are 7.5 metres square and column size is 450 millimetres square. The result is a high degree of flexibility with large open spaces. Necessary fixed function areas include

- the large plant and mechanical equipment area along the northern side of level one;
- a large area of compact shelving occupying eight modules (450 m^2) directly beneath this on level two.
- cloakroom facilities on both levels along the east side;
- the atrium, central ramp and core areas containing lifts and stairways.

The entrance is on the upper level on the south side of the building. On entering the Library, the large issue desk, which includes the Reserve Collection, is to the left in proximity to other staff areas which are located on the west side of the building. An open exhibition area is to the right of the entrance, and beyond this are the subject collections for Law, Science and Tech-

nology (see Fig 5.2). The Law section is separated from Science by strategic placing of shelving, and has its own seminar room. Two further seminar rooms serve Science and Technology and in addition there is a smoking room. The stack arrangement on this level consists primarily of books on the south side, reference works in the middle and periodicals in the north adjacent to the Law collection. Reader stations are situated around and amongst the stacks. In the south east corner on the upper level are the Protected Collections which include Africana, Rare Books, Manuscripts and Government Publications. There is a built in safe for very valuable material.

A series of ramps, centrally situated, lead down to level two, most of which is taken up by bookstack and study areas (see Fig 5.3). As on the upper level, seminar rooms and cloakrooms are found on the east side, staff areas on the west side, and in the south east corner, below the Protected Collections, is a very useful auditorium which seats approximately 146 persons. It is fully equipped audiovisually, with a projection room and remote control console. It is used for library orientation, in-service training, library meetings, and occasional lectures. The reading and stackroom area contains information relating to the Arts and Social Sciences. Seating is to be found around the perimeter and amongst the stacks. Compact shelving is located on the northern side.

Although moveable partitioning provides the necessary flexibility, this quality is slightly reduced by areas such as the auditorium with its sloping floor, the large safe and extra fire protection provided in the Protected Collections area, and certain staff facilities on the west side e.g. kitchen, cloakrooms with showers, and goods lift. On the whole, however, the Library meets the need for flexibility in the following ways:

Fig. 5.2 - Floor Plan, Level One

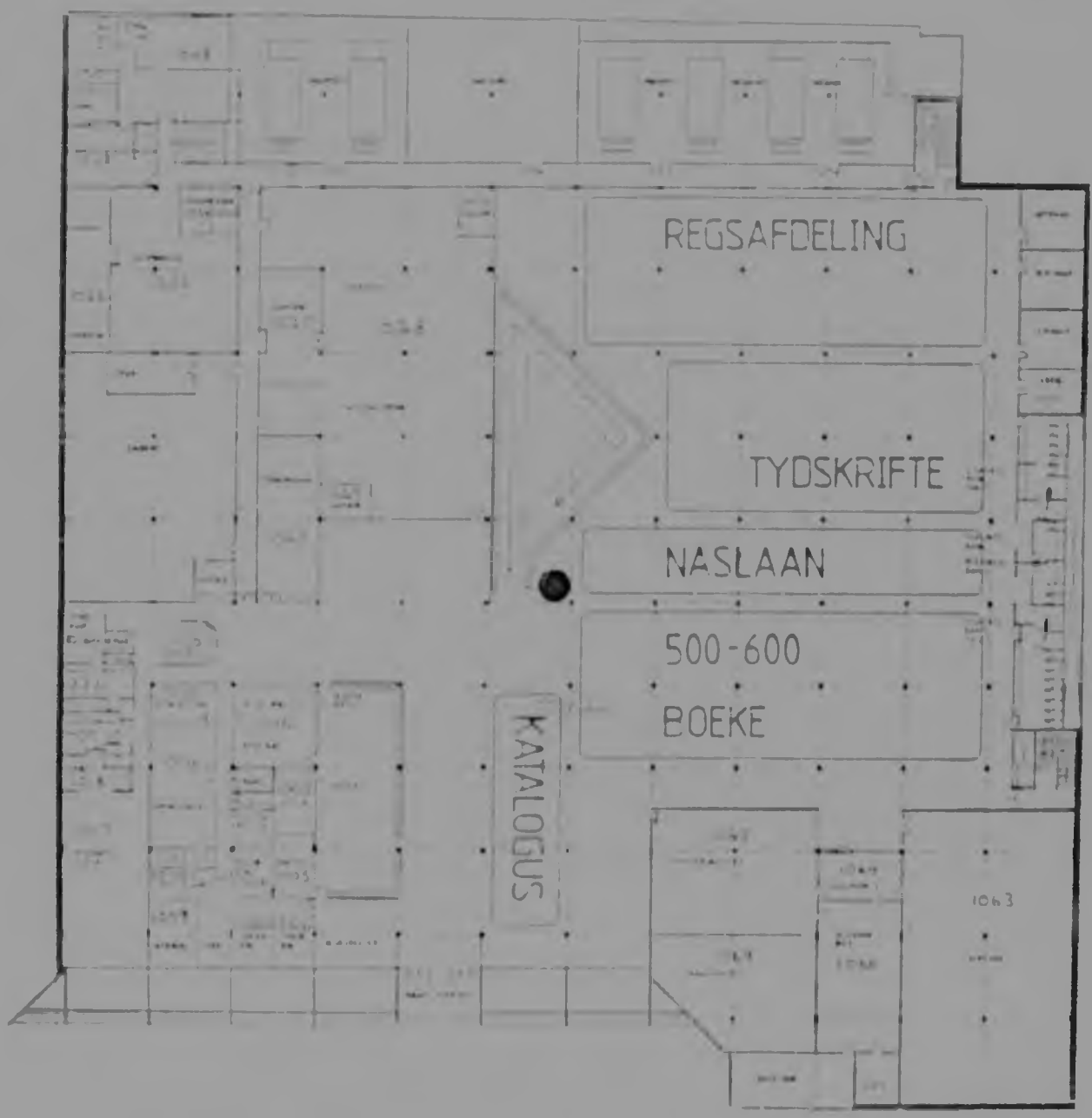
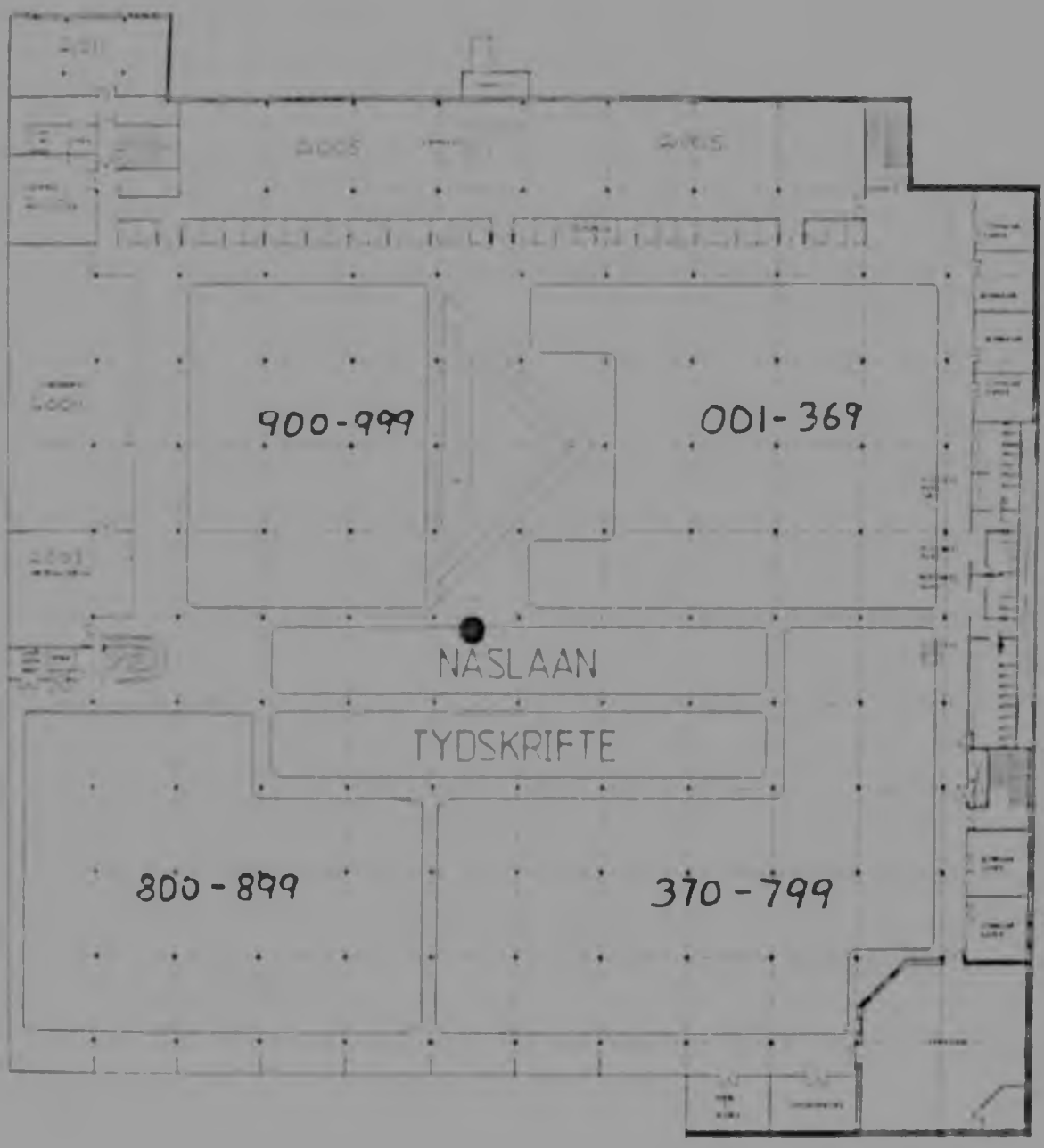


Fig. 5.3 - Floor Plan, Level Two



- air conditioning and environmental control are adequate throughout;
- the lighting is excellent
- the module size lends itself to easy arrangement of book and reader areas;
- the entry of natural light into the inner spaces via the windows on the south and south east and the atrium results in every part of the Library being suitable for public or library staff use

Organization

A library should be organized to allow maximum confrontation of readers with books [4]. Ideally reader stations should be interspersed with open access shelving creating small study areas with a pleasant atmosphere. In the Stellenbosch University Library, much thought has gone into organization so as to achieve this kind of atmosphere. The Library is well planned with logical groupings of related services and functions. The major traffic routes are the ramps on the perimeter of the atrium and the stairs on the west, leading to the lower level. There are in addition emergency stairs and exits on the east and north sides and an exit in the north west corner for staff only. The main entrance area contains many public services such as inter-library loans, the photocopying centre, general reference collection, a display area, the catalogues and an enquiry desk. Staff areas occupy the west side of both levels, with departments such as the Bindery, Restoration Centre and Acquisitions on level one in ideal proximity to the delivery area and goods lift. The stacks are arranged so that users may find books, periodicals and reference works on a particular subject together with five subject librarians

available to supply information to users (see Fig. 5.5). On both levels there is a large sign showing the layout of the two floors, with subject areas colour coded. The colours coincide with brightly coloured discs on the ends of the stacks and suspended from the ceiling and thus it is easy to locate a subject visually. This aspect of organization has been very successfully achieved in this Library.

Internal Environment

As mentioned earlier in discussing the engineering requirements, much care has gone into providing an acceptable and comfortable subterranean environment. The building is not likely to undergo dramatic temperature changes and the air conditioning unit that has been installed appears to be coping easily with requirements. The precaution of back up machinery has been taken to ensure that neither the air conditioning nor the lighting system may fail without emergency units taking over.

Comfort and Variety

Ideally, a library should provide conditions of comfort so that people enjoy using it and work effectively within it. Stellenbosch University Library has provided a variety of seating, including carrels, single tables, group tables and casual seating. A row of thirty two study carrels for post graduate use separates the compact shelving from the rest of the Library on Level Two. Each contains a desk, chair, shelf and power point, is air conditioned and lockable. There are seminar rooms for various types of group use, and smoking rooms are provided for relaxation. On the lower level study spaces look out onto an attractive arrangement of hanging flower boxes on the south and south east sides, and the availability of natural light increases comfort. Natural light also enters through skylights above the atrium, and because these are

at the approximate centre of the building, they are most effective in improving the internal environment. At no point does one feel that one is in an entirely underground library.

Ramps, a public lift and special cloakroom facilities have been provided for handicapped persons.

Approximately 1 500 reader stations are provided in this Library. The furniture was custom made, is an attractive combination of chrome and wood, and is entirely flexible in that tables may be joined together to form group study areas, side panels may be added or removed depending on the degree of privacy required, and tables may be grouped in any configuration (see Fig. 5.6). It was interesting to observe while visiting this Library that the majority of students appeared to prefer the open group study areas to the private carrel desks. Students using the Library have a wide choice of study environment and whatever their choice are assured of comfortable, high quality and attractive work stations.

Compactness

A successful library building should be compact for two main reasons. This quality is necessary for the economical movement of both people and library material within the building, so that traffic flow causes as little disruption as possible. Secondly, a compact building will be more efficient in terms of running costs, use of energy, and maintenance of a comfortable environment (5). The Library fulfills these requirements adequately. Vertical movement has been kept to a minimum (there are only two levels), and horizontal movement reduced by careful location of core areas.

Security

Security has been catered for in the following ways:

- there is an electronic book detection unit at the main entrance exit.

- there is only one main entrance exit to the Library for the public although four exits may be used in an emergency;

- precautions against fire have been taken In the Protected Collections area carbon dioxide gas is provided due to the value of these items In the remainder of the Library there are water sprinklers The building is divided up into blocks and an alarm from a smoke detector activates only one block. The alarm system is linked by computer to Campus Security, and a seven minute delay period between the initial alarm and the activation of the sprinkler enables a security guard to investigate the area and turn off the system unless it is absolutely necessary Although not ideal water sprinklers had to be installed in accordance with current regulations of the Fire Department

External Features

As may be seen from both the site plan (Fig 5.1) and the view of the exterior (Fig 5 4) the Library is visible on the south side, where the ground has been cut back to allow natural light to enter the building Sections of the east side have been similarly handled The major source of natural light is via the large triangular skylight above the atrium The entrance to the building has been attractively designed with impressive stairways of semi-octagonal shape leading from the Square down to the first level. It is on

the major pedestrian and cycle route across the Square, with easy access to the Students' Union.

In the north a small section of the Library rises above ground level housing the transformer, the central vacuum system, refuse removal area and staff entrance. It has been discreetly executed, and does not impose on the open space. Attractive landscaping and brick paving have greatly improved this previously neglected part of the Campus.

Extendibility

It was required that the building provide for future expansion. This is physically possible in the new Library, but would be costly. All expansion would be underground, firstly in a southerly direction towards the Administration Building and secondly eastwards towards the Students' Union. However, it is envisaged that the large area of compact shelving on level two, which can accommodate one million items, will supply space for many years for lesser used material. It is also assumed that before any expansion becomes necessary a cooperative store will have been established in the Western Cape. This would enable the University Library to operate on the zero growth principle (6).

Space Standards

At the time of planning (1979) it was not necessary to take SAPSE space norms into account. In line with overseas standards, an area of 2,7 m^2 per study station was used for reading areas, and the space required for the bookstacks was based on the total holdings of the Library plus projected growth. Departmental and branch libraries were taken into account so that should they be incorporated in the Central Library at a later stage there will be suffi-

cient space to accommodate them. Two such libraries have already become part of the central system (7).

Assessment

The new library at the University of Stellenbosch is successful for a number of reasons. The architects, concerned with the surroundings as well as with the building, have managed to design a modern and highly functional library in an historic environment without its dominating or detracting from the latter. Landscaping of the Square has maintained the basic topography as well as the existing diagonal student traffic pattern, and a sense of continuity has been achieved with the retention of the original statue and sun dial (8).

The Library is thoroughly modern in its organization, structure and services. The system of major routes within allows for easy traffic flow, with natural light emphasising the central ramp. The placing of certain facilities in the same location on both levels allows for easy orientation. Fully air conditioned, with special attention having been given to acoustic treatment of study areas, the Library provides excellent conditions of comfort. It is a technologically advanced and energy efficient building.

Cooperation between the Librarian and Architect was excellent. Throughout the planning stages of the building, the Librarian had regular meetings with both architects and engineers. This enabled the solving of problems in the planning stages and had much to do with the very successful library building which exists today.

Fig. 5.4 - View of Exterior

Fig. 5.5 - Subject Librarian's Desk

Fig. 5.6 - Flexible Study Carrels

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CHAPTER 6. THE UNIVERSITY OF THE ORANGE FREE STATE LIBRARY

Architects:	Van der Walt and Fourie (Bloemfontein)
Floor area:	14 000 m²
Book capacity:	660 000
Reader stations:	1 100
Costs:	Building R10 million
	Furniture & equipment R1,25 million
Library opened:	July 1983
Librarian:	F.J. Potgieter succeeded by H de Bruin

Site and Accessibility

The University of the Orange Free State (Bloemfontein) has one of the most modern library buildings in Southern Africa, situated on the western edge of the University Campus (see Fig 6.1). During the early stages of planning (1976) student enrollment was increasing rapidly and projections indicated that it would in all likelihood reach a level of 10 000 by the year 1990. Extensions to the existing Campus were planned accordingly, and it was supposed that the new Library would eventually be centrally placed in a greatly enlarged Campus. However, for socio political reasons the University is not expanding at the predicted rate and the student population has decreased in recent years. Numbers are expected to level off at approximately 7 000 and a zero growth situation is envisaged. Thus, unfortunately, it is likely that the Library will remain on the edge of this sprawling Campus, isolated from many academic departments (although close to others), and remote from the student residences which are for the most part on the eastern side.

Fig. 6.1 - University of the Orange Free State Library: Site Plan

The Library and the Education Building alongside it are separated from the remainder of the Campus by a road running north south, which is at a lower level than the Campus The two linking bridges one on either side of the Library, are at Campus level These access roads accommodate both vehicular and pedestrian traffic, and are continuations of the original thoroughfares of the University Thus poor accessibility is a consequence of distance rather than access routes

Size and Extendibility

In relation to its student population the University of the Orange Free State Campus occupies a large area with an abundance of land available for expansion Consequently few buildings are more than three or four storeys high The clearly defined lines of the multi-level Library thus stand out against the skyline (see Fig 6 2) Although controversial in some aspects of its design, it has a somewhat imposing exterior with smooth, uncluttered lines, recessed windows, and a deep rectangular shape It is divided across the centre by an oval central service core and system of linking walkways External walls are of pale grit blasted concrete

At the time of planning SAPSE space norms had not yet been introduced and the required capacity of the Library was calculated according to recommended standards outlined by Metcalf, a well known American planning consultant The initial size of the Library as requested by Potgieter Librarian at the time was however reduced due to financial limitations The reduction in size had the effect of bringing it more into line with the SAPSE space norms operative today and also resulted in a more realistically sized library in view of the zero growth situation in student numbers being experienced at the University

The Library and the Education Building alongside it are separated from the remainder of the Campus by a road running north-south, which is at a lower level than the Campus. The two linking bridges, one on either side of the Library, are at Campus level. These access roads accommodate both vehicular and pedestrian traffic, and are continuations of the original thoroughfares of the University. Thus poor accessibility is a consequence of distance rather than access routes.

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Fig. 6.2 - View of Exterior

Fig. 6.3 - North-South Elevation

There is accommodation for 660 000 items (the present stock of the total library system is approximately 460 000 items) and study space for 1 100 readers, approximately 16% of the student population. It should be noted at this point that there are three branch libraries - Medicine, Agriculture and Music, which provide space for subject collections and reader accommodation in addition to that provided by the central Library. There are also five departmental collections which it is hoped will eventually be absorbed into the main collection. In terms of student accommodation the Library will last the expected twenty years. However de Bruin, the present Librarian, believes that in terms of the bookstock, which is growing rapidly, the building has been planned for ten years only (1). In view of the application of SAPSE space norms to all future university library planning, it is very unlikely that any expansion of the Library beyond its present size will be permitted, space being directly related to student numbers. It is therefore possible that the Library could encounter a storage problem in the future.

Flexibility

The Library is modular, with a bay size of 9 m. Although open plan in its construction, flexibility of the building is reduced by its division into two blocks (see Fig. 6.3). The northern block contains administrative and processing offices, staff accommodation of various kinds, the Audiovisual Department and Special Collections. The southern block contains the circulation area, the majority of bookstacks, readers' services departments, and study areas. The structure of the building effectively limits expansion of areas in one block into those in the other. The communications tower in the centre is a wide core containing an impressive series of ramps, public lifts, toilets and foyer areas, which form a physical barrier between the two blocks. In addition, the floors on either side of this central core are at differing levels so that

one is obliged to use the ramps or lifts when moving from one side to the other. Flexible use of space is thus reduced, and traffic in the central area is increased. It is difficult to appreciate what the architect was hoping to achieve by staggering the levels. From an aesthetic point of view it possibly adds interest and character to the building, but in practical terms no purpose is served.

The circulation area (Level Three) and the major reading and stack rooms (Levels Five and Seven) are however very flexible within themselves. They consist for the most part of large open spaces functionally broken up to accommodate different activities and services. Ducting for wiring and cabling is located in the ceiling and power for the use of electrical or computer equipment is available at any point being carried in power columns or poles that extend from the ceiling to desk surface or floor level. Although they are not very attractive, they are flexible and very practical. The power supply is not linked directly to the general electricity supply system, so is very regular and ideal for computer purposes. All partitioning is demountable and may be removed or easily altered should this be necessary.

Floor Layout

Level One, the lowest level of the northern block, contains the delivery area, accessible to vehicular traffic, at the back of the building, a fumigation room for the treatment of donations; an area of compact shelving for the storage of items awaiting processing; a rubbish removal room and bindery. The latter is on the east side and good natural light enters through windows on the north and east walls. Also at this level is the machinery for the automatic vacuum system and occupying a large area to the south, the plant for the air conditioning system. There is also an emergency generator on this level. In general this floor is compact and

well designed, isolating to a large degree from the rest of the building those functions requiring heavy and or noisy machinery.

Level Two is at ground level. An impressive main entrance to the Library overlooks an attractive paved patio area with fountains, and pathways and ramps lead from both roads and the car park. The entrance foyer is a large tiled area with access to the auditorium, overnight reading room and exhibition hall. The auditorium seats seventy six people and is well equipped audiovisually. It is envisaged that in addition to Library use, it will be utilised by academic staff and the public. Swivel chairs are provided so that smaller groups may make use of the area, and there is acoustic damping on the walls to reduce noise level. The exhibition hall art gallery on the west is also a public area and it is hoped that these facilities will assist in developing the Library as a cultural centre on the Campus and in the City. Also on Level Two are general administration offices, a storeroom, and the Book and Periodical Acquisition Departments. The staff lift from Level One is in close proximity to the latter departments for easy delivery of parcels.

Level Three is the main service level of the Library, approached via a ramp from the entrance foyer (see Fig. 6.4). A very large issue desk projects into the centre of the area; it is so large that one wonders whether it will in fact decrease efficiency. At the time of visiting this Library (1983), the Librarian was considering closing off part of it to reduce its size (2). Opposite the desk is the catalogue and information section and a large reading room fitted with moveable screens which provide more intimate study spaces. The general reference collection is housed on the west side. Also on this level are two seminar rooms, a storeroom, photocopying centre and reserve book collection and reading room. There are display areas on both sides of the main hall, as well as an informal reading room where popular magazines are housed.

Level Four, like Level Two below, is primarily a staff area. The Cataloguing Department is located on the west side, a staff common room and kitchen in the centre, and around the perimeter are administrative offices, including a reception area, the Librarian s office his research office, two Deputy Librarians offices, a committee room, computer room the Public Relations Department, and Personnel.

On Level Five are three information service points staffed by subject librarians in close proximity to catalogues and reference collections The Law Collection on the east side, although a separate collection is not physically divided from the rest of the stack/reading room Level Five has been expanded across the central core to Level Four and an additional study area has been located here This very successful due to the structural design of the buildi d the change in level Level Seven follows the same gene al pattern as Level Five Periodicals are located towa the centre, books are housed in the outer stack areas, and r ader stations are around the perimeter where natural light enters the building through large windows On both levels there are two seminar rooms a photocopying room smoking room, lockable study carrels and a r umber of casual chairs

Level Six contains a large audiovisual section, with eighty six carrels, a storage area and service counter All carrels have been fitted to accommodate audiocassette players, sixty five will accommodate tape slide equipment and twenty five are fitted with monitors for video playback There are also five microform readers. A total of R209 000 was spent on audiovisual equipment, but one wonders whether initial usage of the facility will justify such expenditure The carrels are rather small for students to work in comfortably, and more space per unit should have been provided The other half of this level is occupied by the Special Collections Department, with a large closed access Africana

stackroom, a service counter, reading room, the Banned Books and Theses Collections on closed access, and a photocopying facility

Level Eight above houses lesser used material. There are photocopying facilities, a service counter, and eleven lockable study carrels In the north east corner is a large area of compact shelving.

Internal Environment

Air conditioning is provided throughout the building with a small stand-by unit in case of failure of the main system A wide variety of seating and study environment has been provided for users. In addition to audiovisual carrels there are carrel desks in the reading areas lockable study carrels for use by academic staff and post-graduate students five seminar rooms for the convenience of lecturers utilising library materials in their teaching, some relaxation areas, as well as easy chairs distributed throughout the Library The overnight reading room on the ground floor makes provision for students to study without disturbance, and is open twenty four hours a day

Floors are for the most part carpeted in bright green tiles, which bring colour and warmth to the internal spaces The core areas, foyers and major traffic routes are finished in ceramic tiles, as is the area surrounding the Issue Desk In the case of the latter where there is heavy traffic, the ceramic tiles will wear better than carpeting, but loaded book trolleys passing over this area will certainly increase the noise level in this section of the Library.

An interesting feature regarding furniture is the method used to distinguish between two types of service counter in the Library.

All document delivery counters e g. Issue Desk and Inter library Loans, have melamine surfaces, while information counters e g subject librarians and enquiry desk, are comprised of modular wooden units.

Security

Book theft is discouraged by the use of a double gate electronic book detection system at the main exit point on Level Three. There are fire escapes on three sides of the building, which are architectural features in that they repeat on a very much smaller scale the oval shape of the central communications tower. They may also be used by students for internal access to other levels of the Library. The fire protection system consists of sprinklers in the Basement (Level One) only and smoke detectors linked to a central control panel on all other levels. From the control panel, which is located behind the Issue Desk, signals are relayed to the University's Security Department.

Assessment

The new library building at the University of the Orange Free State is impressive and dignified. It dominates but does not overpower other buildings on the Campus and one hopes that with time some of its sharp angles will become a little rounded. Landscaping and the growth of trees and gardens in the vicinity will help in this respect. The Library's internal spaces are generally well utilised, with functional juxtaposition of various departments and services. It can be clearly seen that much thought and care went into the planning and for the most part it is successful. It is unfortunate that this achievement is marred by certain disadvantages. Noteworthy aspects, both positive and negative, are mentioned below:

- The site of the Library is far from ideal; it was chosen in terms of a future which will probably never materialise;

- The structural division down the centre of the building reduces flexibility and this could impose limitations on the Librarian in the future when changes become necessary;

- Although it may be convenient in many respects to separate staff and administrative areas from the public reading and stack areas, the splitting of the building in this way limits effective expansion of user areas. Despite the use of subject librarians on each public level, professional staff are isolated from library users, in particular their academic colleagues. Informal communication should be encouraged, and this is easier in an environment where there is more possibility for contact. Communication of this type in the University of the Orange Free State Library is further hampered by the different levels of the north and south blocks;

- The audiovisual area could have been more conveniently located at a lower level;

- The large open entrance area with deep wells extending from Level Two to Level Seven could prove noisy, and is also wasteful of space.

- Traffic routes are simple, and are the same on each floor, thus avoiding confusion on the part of the user. The main routes are the ramps on the east and west sides of the building (see Fig. 6.5). These are suspended from the roof, are aesthetically very attractive, and also very impressive, but they utilise a lot of space, and distances covered are great. Will the students really make use of them beyond level three, or will they overcrowd the few public lifts provided? On the other

hand, a visually open route maintains user orientation while moving between floors and can perform an important psychological function;

- A good feature is the staff lift located in the central core of the northern block, which connects all levels with the delivery area and service entrance on Level One;

- The arrangement of staff areas is thoughtfully and functionally conceived.

- Finally, in view of the growth of academic library collections in this country, the Library could perhaps have benefitted from more generous provision of storage space. Now that there are space restrictions imposed on academic libraries in terms of the SAPSE norms, one tends to look on large foyers, deep stair wells and wide spacious traffic routes as being somewhat wasteful of space that could possibly be better utilised. But this is regrettable because it is often such features which give a university library building the symbolic importance it deserves in its academic environment

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Fig. 6.4 - Entrance to Level Three

Fig. 6.5 - Series of Linking Ramps

Fig. 6.6 - Floor Plan, Levels Two and Three

CHAPTER 7. LIBRARY SPACE STANDARDS IN THE UNITED KINGDOM

British universities are financed and administered by the University Grants Committee (UGC). In 1963 a sub committee under the chairmanship of Parry was established to consider the most effective and economical arrangements for meeting the needs of universities for books and periodicals (1). *The Parry Report* (1967) which resulted was a valuable survey of a wide range of factors in university libraries and contained a number of recommendations. However space standards were not comprehensively included and a working party was subsequently established by the UGC to make recommendations in this area. These were set out in the UGC's *Planning Norms for University Buildings* (1974), and in brief were as follows:

- Book storage was to be provided on the following scale:

	Books m^2/1000 vols	Bound Journals m^2/1000 vols
Open access:	4,65	9,35
Closed access (fixed)	4,03	8,06
Closed access (rolling):	2,07	4,13

With a typical mix of material this suggested some 5,83 m^2 per 1 000 volumes overall.

- Reader places were to be provided at a ratio of 1 5 for all Arts students and 1 7 for all Science students. Provision for

academic staff and post graduate students was included in these norms with certain exceptions.

- Administration and all other support facilities should be provided within an area of 18% of the sum of reading and book storage areas.

When a new library or major extension was planned the UGC was prepared to take into account reasonable requirements for future growth to provide for ten years accessions of publications and ten years' increase in student numbers. The UGC's policy at the time was thus to encourage libraries to develop their stock and services to provide up to date information as well as access to older stock and to provide suitable space and conditions in which readers could work. However, within a short space of time, the UGC was forced to reconsider these norms. The number of new publications had increased rapidly, causing an increase in the need for more library space. In addition the cost of building new libraries and extensions had been rising steadily.

The Atkinson Report

A working party under the chairmanship of Atkinson was established to review the Committee's policy for the provision of library buildings. The results of these investigations were published in 1976 and have become commonly known as *The Atkinson Report*. The recommendations made form the basis for university library planning in the United Kingdom. However, in the words of the Chairman, "they are not rigid prescriptions to be forced indiscriminately on universities; they are to be applied with judgement and pragmatism" (2).

It was intended that the policy should be realistic in its claims on resources, but should still enable universities to maintain and

in some respects improve their library services (3) As a starting point the Working Group endorsed the principle that reader stations should be related to planned student numbers, but it questioned the concept of providing for the whole of a library s existing stock and anticipated acquisitions It was felt that this would lead to indefinite accumulation which could result in organizational problems and a lessening of the efficiency of the library s service The cost of maintaining access to the collection could well encroach upon the funds for acquisitions The Working Group thus suggested the concept of the self renewing library in which new accessions would be balanced by the withdrawal of obsolete or unused material to other stores

In attempting to work out academic library requirements, Atkinson s Committee considered seven factors (4)

1 **Reasonable minimum provision of shelving (excluding special collections) for the self-renewing library.** Basic to this was whether it was reasonable to relate size of library to number of students disregarding the length of time over which the library had been in operation Research was carried out at universities in the United Kingdom and it was concluded that the age of a university library was not closely connected with the amount of shelving required, but that the number of full time equivalent (FTE) students was Results ranged from 6.59 to 2.26 m per FTE student, the average thus being 3.70 m per FTE student The conclusion of the Working Group was that 3.8 m of shelving per FTE student would be a reasonable yardstick on which to base academic library development Universities with departmental libraries were expected to provide for them within this allowance

2 **Provision made for future growth.** The underlying principle is that if a library is adequate at present, it will continue to

be adequate if its growth at a certain rate of accessions per year is balanced by a similar rate of withdrawals. However, the volume and rate of growth of material published is also relevant. In 1975 the Working Group found that the world production of monographs had been increasing at an average rate of 6% per year. There were however marked fluctuations, and growth appeared to be slowing down. The rate for periodicals was approximately 4% and this too appeared to be decreasing. The Committee decided that an annual growth rate of 4% in world production would be a reasonable assumption. It was then discovered that library accessions were not growing at the same rate, but in fact were fairly constant at 5,75 volumes per FTE student annually. After considering various factors, the Committee concluded that an addition to the norm of 0,2 m² per FTE student should be sufficient to provide for growth in accessions over a ten-year period.

3. **Inter-library lending, local library cooperation and financing.** With a general reduction in acquisitions for financial reasons, one could expect an increase in the use of inter-library lending. This is true, though somewhat tempered by the increasing cost of borrowing. It is unlikely that this factor will have any effect on the space needs of libraries.

Regarding local library cooperation, studies in Britain have shown that there is not much overlap amongst libraries. Thus little saving in space may be expected either from the disposal of existing duplicate stock or from the avoidance of duplication in new acquisitions.

The financing of British universities in the future will certainly have an effect on the number of publications purchased annually, but this cannot be accurately assessed.

The factors mentioned above were considered relatively unimportant in the overal calculation of space

4 **Special Collections**. Most university libraries have special collections of books and manuscripts, often accepted under terms or conditions which preclude them from being relegated to store In addition, they are often valuable and of scholastic importance The Working Group recommended that the UGC should be prepared to consider each case separately, and to allow up to 100% of the space needed as additional to that calculated for the remainder of the bookstock It suggested, however, that the acceptance of a donation could use a significant proportion of a university s capital, particularly where there was an obligation to keep a collection up-to-date The Committee believed that the UGC should be consulted when a university proposed to accept a collection of more than five thousand items so that the long term financial consequences could be fully considered

5 **Relegation**. Basic to this is the assumption that it is economic to withdraw annually from the stock a proportion of little-used material which will balance the current year s acquisitions. Withdrawal is a complicated and costly procedure An interim local store should be provided to which books may be removed and retrieved within twenty four hours if required Material still unused after five years could then be removed to a national store Fewer problems are encountered with journals; selection is simpler and the cost of withdrawal is less in relation to the space freed Items withdrawn *must* be stored more cheaply than in the main library

6 **Reserve storage**. There are a number of ways in which this may be provided

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6. **Reserve storage.** There are a number of ways in which this may be provided:

- within an existing building or extension;
- in a local store exclusive to the university;
- in a local store shared with other local institutions;
- in a regional store
- in a national store

The most practical combination is thought to be some form of local storage and a national store.

7 **Reader stations.** The existing UGC norm provided one reader station (at 2.39 m^2) for every five Arts students and one for every seven Science students. Later surveys indicated that the provision of a new building leads to a higher rate of use, and confirmed that Arts students tended to use the library more than Science students. The Working Group concluded that one place for every six students overall would be appropriate, and that the area of 2.39 m^2 per reader station was adequate.

Recommendations of the Report

The results of the investigations of the Working Group were that:

- 3.8 linear metres of occupied shelving per FTE student be allowed, which is 0.62 m^2 per FTE student when translated into area;
- the amount of space provided for administration be 20% of the total area needed for books and readers;

- if one takes one reader station at 2,39 m^2 for every six students the following becomes the overall norm:

Seating	0,40 m^2
Bookstack	0,62 m^2
	1,02 m^2
Administration	0,20 m^2
	1,22 (i.e. 1,25 m^2 / FTE student)

- future university library building requirements should be based on the concept of a self-renewing library.

- the size of the library should be assessed by

  - applying the norm of 1,25 m^2 to the planned number of FTE students

  - adding provision for future growth at a rate of 0,2 m^2 / FTE student (projected ten years ahead);

  - adding appropriate provision for special collections.

  Only if the area calculated in this way significantly exceeds the area of the existing library will the possibility of additional space be considered;

- space for a reserve store should be calculated to cater for the closed access storage of five years' accessions at current rates;

- once a university's reserve store is filled, surplus stock should be sent to the British Library (Lending Division).

The UGC accepted the Committee s recommendations provisionally, with the intention of further considering its policy over the next several years However, the ensuing uproar was so great that the UGC was obliged to announce the immediate establishment of a steering group on library research The general opinion of librarians on the *Atkinson Report* was that it was naive and too hastily prepared to be applied to what is after all a very complex problem Bryan (5) Librarian of the University of Sydney, in reviewing the *Report* and its possible application to Australian libraries, called it an extremely dangerous document presenting as it does the apparently reasonable exposition of an extremely glib oversimplification

Comments

A number of criticisms have been made of the *Report:*

1 The Standing Conference of National and University Libraries (SCONUL) (6) rejected the concept of the self-renewing library on the grounds that

- it was a crude instrument for dealing with a complex problem,
- it was based on inadequate research,
- it paid too little regard to the needs of scholarship, particularly in the humanities,
- even in economic terms, no adequate argument in favour of self renewal was established in the document,
- there would certainly be loss of potential donations due to the strictures placed on their prompt acceptance;

- there was a high level risk involved in basing the whole scheme on one national storage library, the British Library (Lending Division).

2. The Working Group stated that their first concern was to establish whether it was reasonable to relate the size of the library required directly to the number of students (7). It then calculated the average number of linear metres of occupied shelving per FTE student and this figure became the basis of the UGC norms. No further mention was made as to whether this was in fact reasonable and no justification was given for using this factor.

3. Apart from a library providing for the book needs of students, the size of the bookstock need not necessarily be related to the size of the student body except in the provision of multicopies. What every library requires is a basic general collection relating to teaching and research programmes, whether the university be small or large in terms of student numbers.

4. When one looks at the requirements of post graduate research students, there is even less correlation between student numbers and bookstock because numbers are seldom large enough to require the provision of multicopies, and in addition, stock must be built up in much more depth, detail and sophistication. To link provision permanently with student numbers places unnecessary emphasis on undergraduate studies, and at worst infers that the library has no function in relation to research (8).

5. In any good university library the material acquired for undergraduate use comprises a steadily decreasing proportion of the total stock. One thus limits the size of a good library

by relating it directly to student numbers. Consequently many institutions will be committed to inadequacy unless their student numbers rise. *The Atkinson Report* threatens most of all those libraries remote from the major national libraries. With severe limitations on the size of their own stock and no easy access to other resources, they could cease to exist as places of serious study

8. The *Report* recognised that if a library became self renewing there would be additional recurrent costs involved in selecting and moving withdrawn books, adjusting records, and fetching requested books. It stated, however, that these costs would be limited compared to those spent in cleaning and maintaining ever growing bookstacks on open access. This feeling was not shared by university librarians. Economies of storage must be set off against staffing costs. Gibb (9) mentioned in 1976 that Manchester University Library would have to employ an additional twelve senior members of staff and ancillary labour at a cost of £90 (XX) per year to withdraw 50 (XX) volumes per year.

7. The great difficulty of deciding what to withdraw was recognised by the Working Party. However, it did not offer any helpful advice on the subject, instead referring readers to Annex H of the *Report*, a note by SCONUL (10) stating:

> "Loans provide in most libraries the only quantifiable indication of the use of the stock. Even then they are inaccurate guides, since a loan is only a declaration of intent. Few libraries will have statistics of in-library use, even though this might be more useful. Books consulted within the stacks and books treated as reference material may very well be a more valuable contribution than those borrowed".

Further information is thus needed about the way in which books are used

8 Regarding withdrawal a further difficulty is the reduction in browsing which results In the Humanities especially, a library is a place where ideas may be stimulated by a good collection and the chance encounter made through browsing The Association of University Teachers (AUT) (11) amplified this point:

> "It is not just a question of browsing. It is a matter of not putting out of use materials covering a wide range of time and not destroying completeness"

Urquhart (12) believes however that the existence of subject bibliographies today more than compensates for possible loss in browsing He suggests that the research worker should be interested in what exists on a particular topic rather than what a particular library contains on that topic.

9 Havard-Williams and Gilman (13) believe that there are widely differing stock and space requirements for different subjects and individual universities Arts students generally need more books than science students Scientists generally need recent material whereas arts students may require a good deal of retrospective material Thus any policy which advocates withdrawal at a rate equal to acquisition, so bringing about a gradual updating of the stock, could possibly be penalising arts students and those working in specialized fields

10 Individual universities inevitably encounter their own unique problems because of factors such as size age locality, and fields of teaching and research At Essex University, for example, a year's acquisitions amounts to a high percentage of the total stock, Manchester University would incur far

greater costs by storing at the British Library than locally; the Librarian at Bristol University considered that the trading of old books for new would erode the careful building over a period of years of research collections (14).

11. There is a substantial reduction in the space allotted to readers. By providing one place for every six FTE students, a library is supplying study space for only 16,6 % of the total number of students. The majority of university libraries in Britain exceed this norm and it seems unfortunate that one of the good standards achieved in British libraries is likely to be reduced. Bryan (15) points out that as regards reader places, nearly all Australian libraries provide seating for far higher percentages of the student population. Many range between 30% and 40% thus casting some doubt as to the usefulness of this standard.

Thus although the self-renewing library may on first consideration appear to be a simple concept, the problems involved in putting it into practice are numerous. Even though universities are having to rethink their growth policies in view of financial cutbacks the decision of the UGC to instruct them on how they should deal with one expensive part of their committment the library was too facile a solution (16). The answers to university library problems in the United Kingdom are not likely to be found in *The Atkinson Report*, but will be as varied as the universities themselves. One positive outcome of the *Report*, however, is a greater awareness of the situation and the need to alleviate it. To this end much research is now being undertaken and alternatives to the self renewing concept considered.

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CHAPTER 8 EDINBURGH UNIVERSITY LIBRARY

Architects	Sir Basil Spence, Glover and Ferguson (Edinburgh)	
Floor areas	Gross total area	27 720 m²
	Total usable area	20 006 m²
	Balance area	7 714 m²
Accommodation	Book capacity	·2 million vols
	Reader stations	2 500
	Staff	114
Costs	Building cost	£1 700 655
	Furniture & equipment	£ 400 900
	Total	£2 101 555
	Cost/m² (unfurnished)	£61
Date opened	September 1967	
Librarian:	E R S Fitoot	

The University Library was founded in 1580 when Clement Litil, a local advocate died bequething his collection of three hundred books to "the Toun and Kirk of Edinburgh" (1). From this collection, of which 276 books remain, the Library has grown to its present size of well over 1·6 million items, housed in the main and several branch libraries.

In 1961/62 the University's requirements for a new main library were stated in a substantial brief (2), which was expanded and modified in the course of planning and in the light of the developing regulations of the University Grants Committee. The plans were however passed before restrictive measures were introduced, and thus the Edinburgh University Library was not limited financially to any great extent. In summary, a building was re-

quired which would serve the needs for study and research of a student population of between five and six thousand, principally in the Faculties of Arts and Social Sciences. The building was also to house the central administrative and processing services of the whole University Library system, manuscripts and rare books, and the Central Photographic and Binding Departments. The majority of books were to be on open access and available to all readers. A prime requirement was that the building should be as flexible possible with all floors strong enough to bear full stack weights at all points and readers and library staff assured of good lighting, ventilation and low noise level throughout the building. The Library was to be simple in layout to facilitate both the easy orientation of readers and rearrangement of areas for alternative library use. The architect was to provide accommodation on the smallest number of floors possible and in such a way that vertical as well as horizontal distances within the building were as short as possible.

The Library was to serve the needs of both undergraduate students and research workers, the primary provision for undergraduates being large reading rooms stocked with most used texts, while that for post graduates and academic staff would be less formal seating in close proximity to the stacks. Both groups would require ready access to all parts of the Library. Finally, the building was to be planned in such a way that it could be extended if necessary.

Site and Access

Edinburgh University, like many British universities of its age, is scattered over the City, although there are concentrations of University buildings at George Square and King's Buildings. The Library is located on the south west corner of George Square, and commands a beautiful view of the Square. Unfortunately an

old University building had to be demolished to make way for the Library - an unpopular decision with many of Edinburgh's citizens. But one cannot deny that the Library occupies an ideal site, and although very large, certain restrictions placed on the building by the planning authorities of the City and the University have ensured that it does not dominate the area to any great extent. The City authorities enforced a height restriction which, when coupled with the floor area and the curtilage of the site, dictated the massing of the building (3). New buildings adjoining the Library were already designed with a strong horizontal emphasis. Restrictions were also placed on the external finishes of the Library. Vehicular access is via Buccleuch Place and George Square Lane, while pedestrian access tends to be primarily from George Square itself and the University buildings surrounding it.

Extendibility

The *Brief* stated that the building should be planned such that an extension could readily be attached to the south east side. Thus there were to be no permanent obstacles to expansion (such as stairwells, lifts or toilets) at this point (4). However, it is very unlikely that Edinburgh University Library will ever be extended. Having been planned and built prior to the University Grants Committee restrictions of the 1970's, it contains an extremely generous amount of space. Its capacity is two million volumes. With the Library expected to serve for about seventy years (5), it will be some time before self renewal becomes a reality at Edinburgh.

Fig. 8.1 - Edinburgh University Library: Site Plan

Fig. 8.2 - View of Exterior

Flexibility

The library was planned and built to be the main library of the Campus for the forseeable future. As it is difficult to forecast the development of a university or the pattern of library use very far in advance, and considering that technological changes will in all certainty alter the character of library services, it was emphasised in the *Brief* (6) that the planning of the building be modular with load bearing columns at regular intervals, no load bearing interior walls, uniform ceiling heights and all floors capable of bearing stack weights. The prime requirement of flexibility also dictated that the bulk of each floor should fit exactly and without horizontal voids over the floor below. Fenestration and the siting of stairwells and lifts were also to be such that interior rearrangements could readily be effected.

Adaptability, the freedom to interchange book storage areas with reader areas and other work places while still maintaining optimum conditions for each, is one of the main features of the Edinburgh University Library. The module size is 8.4 m., and this allows complete freedom of bookstack layout in either direction with stack centres at a choice of 1.17 m., 1.35 m., 1.65 m., and 2.06 m. The uniformly distributed load is 10.7 kN m^2, which could allow for compact shelving throughout. Very few libraries today can afford floor loading of this strength. 7 kN m^2 is the norm. Should it become necessary in the future, this library will thus be able to greatly increase its capacity without any major structural alterations of any kind.

Flexibility is also affected by ventilation, temperature control, lighting and ceiling height. Although Edinburgh University Library has full air conditioning throughout, flexibility has been restricted by the combination of a 2.44 m. high ceiling (the generally accepted height is 2.59 m.) and fixed, continuous recessed

fluorescent lighting in strips at 1,35 m centres across the width of the building along bookstack aisles. The tops of the bookstacks are within 152 mm. of the ceiling, which means that the stacks are restricted to the direction and position in which they are presently placed so as to maintain an even distribution of light. It is unfortunate that this building, planned and built for flexibility, should have this quality reduced by the lighting system.

In spite of this, though, the architect has achieved a great measure of success as regards flexibility. Seventy-five percent of the floor area could accommodate either books or readers efficiently without major alteration (7) a particularly high percentage. Adaptability was tested early on in the life of the building. The original requirement was that the Library should accommodate 1 900 readers and two million volumes. The subsequent rapid expansion of the University caused the requirement for reader places to be increased to 2 500 and this was achieved at the expense of a small proportion of the stack capacity but without alteration to ducting or walls.

Floor Layout

The Lower Ground Floor houses the plant rooms, Photographic Department, Bindery, staff room an immense covered loading bay, and closed access stack areas. At the front of the building on this level, with access from the main entrance, is a readers coffee room.

The Ground Floor accommodates various library services such as the control desk, service desk and catalogues, main reference room, current periodicals, Rare Books Department, and an open plan work area for technical processing departments (see Fig. 8.3).

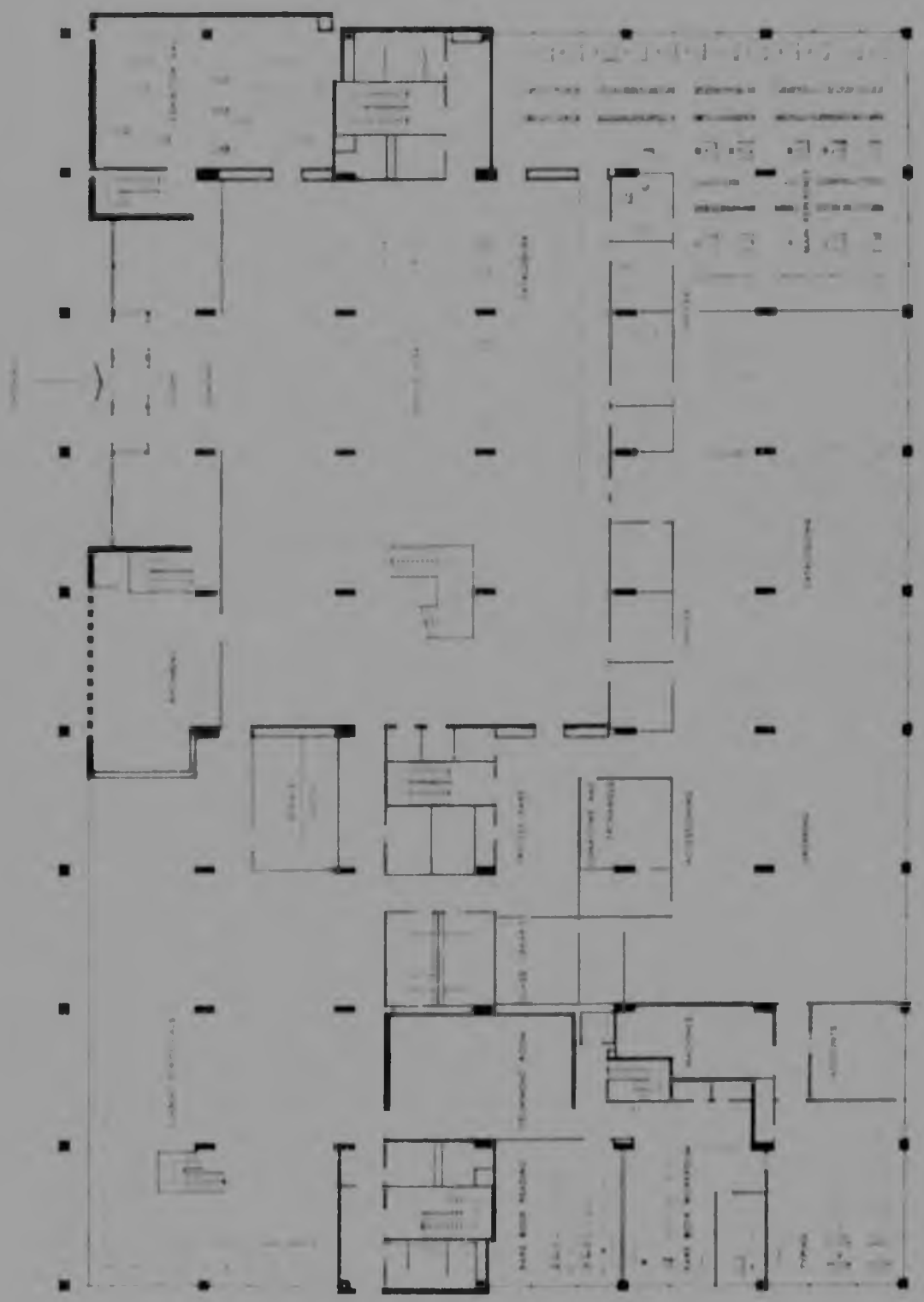


Fig. 8.3 - Floor Plan, Ground Floor

Fig. 8.3 - Floor Plan, Ground Floor

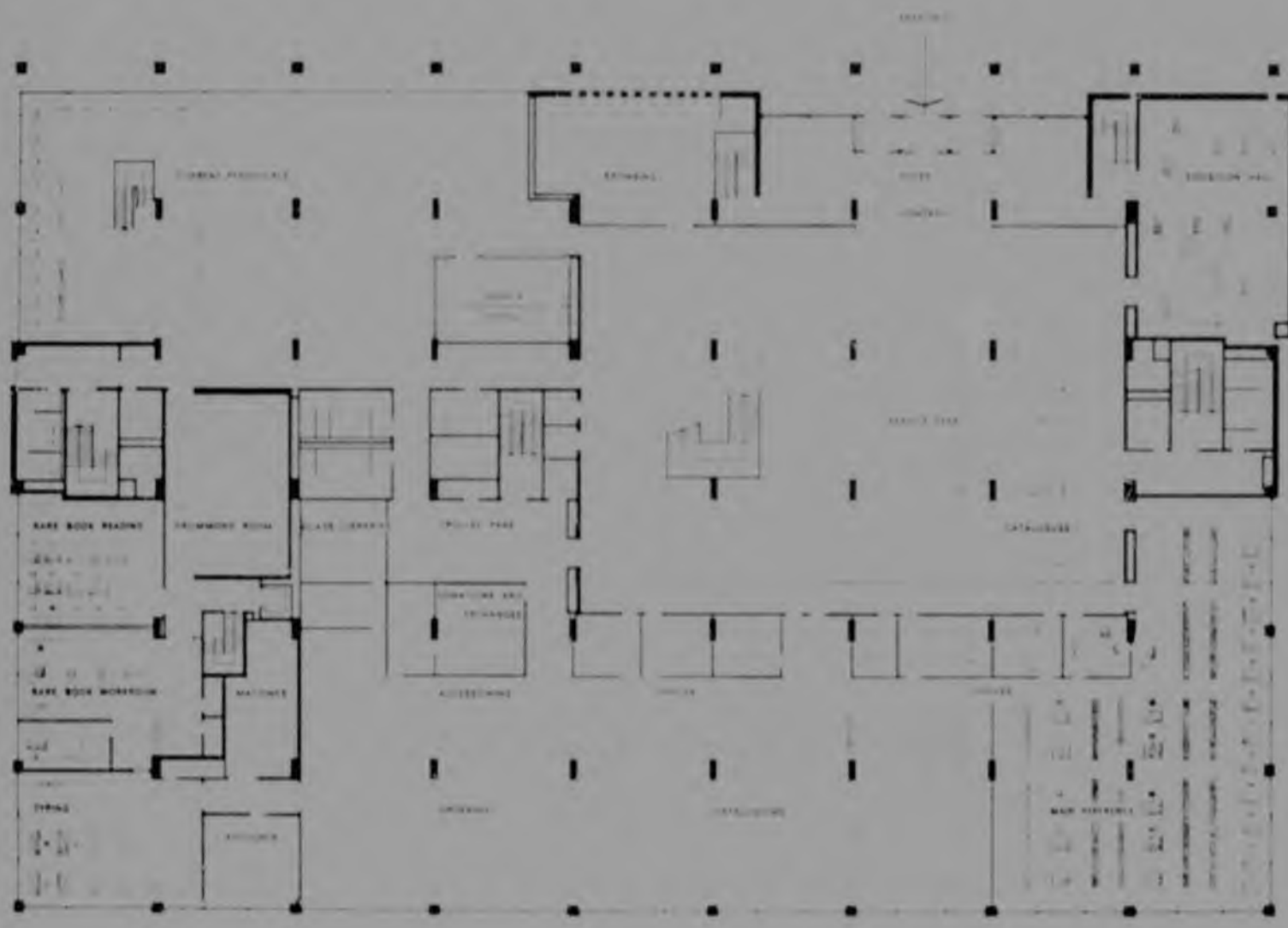
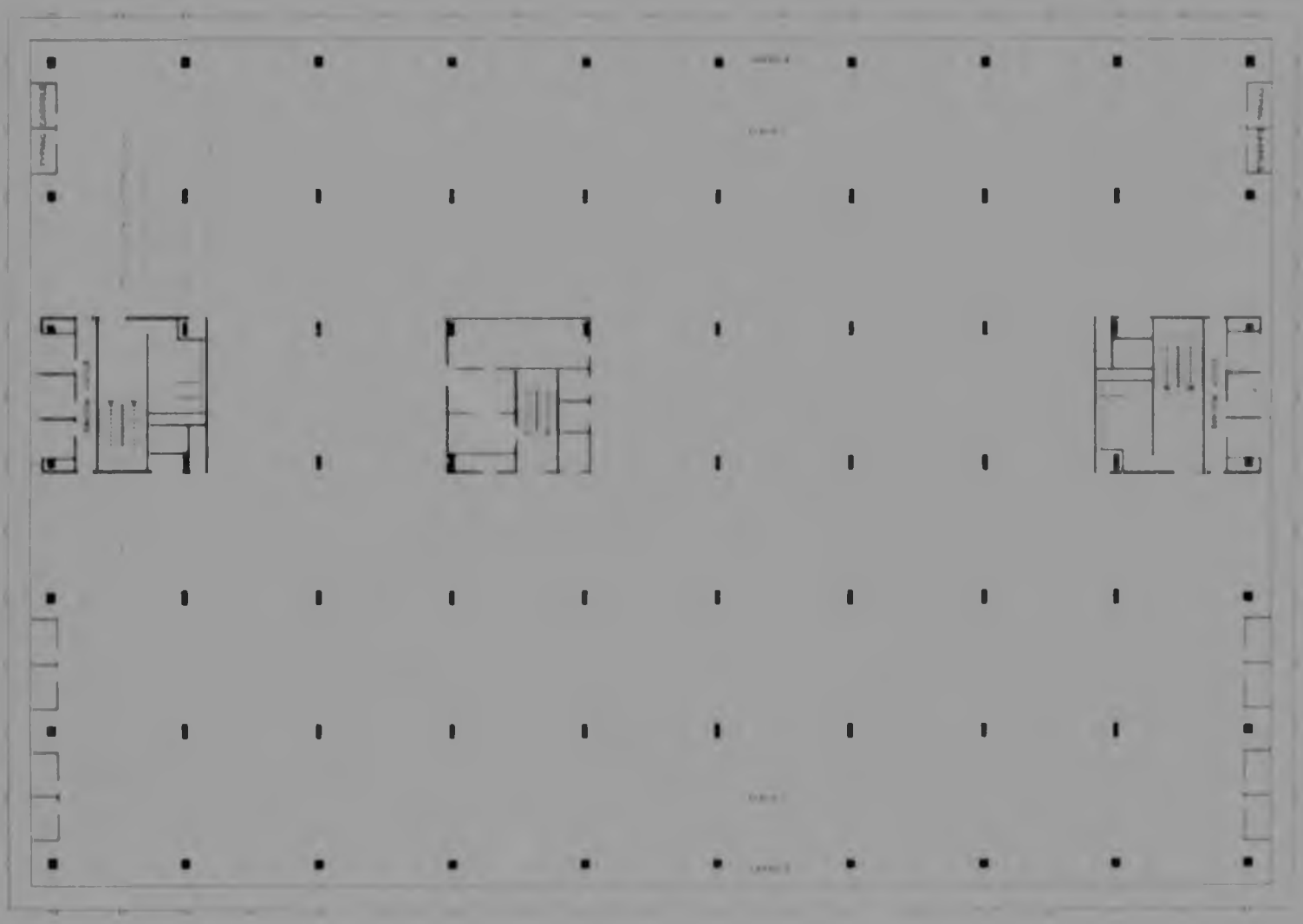


Fig. 8.4 - Floor Plan, Typical Upper Floor



The First Floor houses the central administration of the Library, a committee room, the undergraduate reading room and the photocopying room. Because the entrance foyer on the Ground Floor is double height the arrangement of the First Floor is restricted, and the layout is consequently somewhat confusing.

On the Second Floor is the reading room housing the main collection of text-books for first- and second-year students in the Arts and Social Sciences. There is also a listening room for the Library's collection of audio recordings.

The Third, Fourth and Fifth Floors of the building all have study and research accommodation in the form of tables, open carrels, and closed study and typing rooms. The Sixth Floor is a closed access area, housing theses and a number of special collections.

Compactness

The Edinburgh University Library is compact. It is a large rectangle approximately 76,25 m long and 45,75 m. wide, with eight floors. The main user core is towards the centre of the building on each level, with additional staircases on either side. Internal movement is thus straightforward and travel distances have been kept as short as possible. However, the Library is large, and despite correct placing of lifts and staircases, distances from one part of the building to another are great. The Librarian in charge of building and planning (8) feels that the Library is too big. The desire of the planning team not to underestimate the size of the building has possibly led to over compensation.

Organization

The Circulation and Information Desks are centrally placed and immediately obvious on entering the Library. Vertical circulation

routes are central and easy to locate on each floor. Above the main floor the arrangement of major library elements is repetitive. Thus even though it is a large library, the reader is generally able to find his way around the building without too much difficulty.

Variety

Reader accommodation consists of approximately 1 300 seats in the First and Second Floor reading rooms, consisting mainly of single tables in large groups within the stack area, two hundred open carrels on the perimeter of the various floors; forty typing carrels, twenty study rooms and further seats scattered over the stack floors in oases and along the peripheries. The remaining reader stations are in the various reference rooms, the current periodical room and the manuscript and rare books department. There is a wide variety of seating, much of it of excellent quality. The design of the open carrels is particularly successful, comprising a substantial work surface with cupboard below and bookshelf above, each fitted with a power point and provided with a wastepaper basket (see Fig. 8.5). Research carrels are also well designed. In addition to a work surface with drawer below, there is sound proofing, a side table for typewriter, a table lamp, power point, wastepaper basket and two chairs.

The *Brief* to the architect (9) specifically requested that reading rooms should not be of the monumental kind, but rather a series of areas not necessarily uniform in size, screened by shelving or other furniture. However, reading areas at Edinburgh do tend to be larger than one finds in the newer (and smaller) university libraries in Britain today, and they are not very successful. Possibly this is related to the overall size of the Library, but much could be gained if attention were given to rearranging the reading/stack areas into smaller, more intimate spaces. Of three

seminar rooms provided initially, only one is used for this purpose currently. The others are used to house special collections.

Comfort

The usefulness of library spaces is determined to some extent by the physical conditions that exist in them. There are several aspects to be considered, ranging from comfort of library users and staff to the need for preservation of rare manuscripts. As regards heating and ventilation, the following physical conditions are regarded as ideal:

Temperature:	20.6°C ± 1.7°C
Relative Humidity:	45% - 55%
Air Change	Minimum of four changes per hour
Air Filtration	Filtration should be effective against particle size in excess of one micron. In industrial areas air washers should be used

Edinburgh University tries to maintain a temperature of 20°C and a relative humidity of 55%. There are five air changes per hour. Filtration is to a five micron size, and in addition an air washer is used (10).

The Library has full height double glazing on all sides, which is largely an attempt to relieve the claustrophobic effect of large floor areas and low ceilings. Care has been taken to control heat gain and discomfort to readers from direct sunlight on this glass, and each floor projects 1.37 m beyond the face of the window to form a continuous balcony. In addition, there is heat absorbing glass on the south face, and fixed louvres on the east and west faces. In winter, additional heating is provided around the periphery of the building. Despite all these precautions, the large window areas produce considerable variation in temperature be-

tween reading stations on the south and north sides of the Library. Air conditioning helps to counteract temperature fluctuation, but as mentioned earlier, breakdowns occur, causing serious problems in a building of this size.

The Library has good overall lighting. Illumination levels are 380 - 430 lux at the work surface, and 130 - 160 lux on the vertical surface of the bookstacks (11). The fittings are fixed, recessed fluorescent tubes combined with the air conditioning ducting. Somewhat unimaginative, they form continuous strips across the building. The full height windows on all sides of the building allow much natural light to enter the peripheral areas. However, on the south side there is a certain amount of glare and dazzle, especially in winter, despite the use of tinted glass. In many areas there is also a problem with reflected glare caused by polished desk surfaces and linoleum flooring.

To lessen visual and aural disturbance, activity areas are segregated from quiet reading areas and sound absorbing materials are used on floors, walls and ceilings. The entrance and circulation desk area is closed off from all other areas. The lift lobby within the central core is divided from the two undergraduate reading rooms by glazed partitions. Groups of readers are isolated from the core and from each other by the stacks. To further reduce noise, acoustic ceiling tiles are used throughout the building, and carpeting is used on the two undergraduate levels. On stack floors, carpeting is laid within reading areas only; the linoleum flooring used elsewhere produces less noise than expected. Finally, fixed double glazing prevents the entry of outside noise. Although it is a large building with many occupants, there is little disturbance to the individual.

Construction and Materials

The building has eight floors, the eighth being considerably smaller than the others and thus not visible from ground level. The structure is faced with precast concrete, finished with a veneer of Portland stone. Concrete columns and balcony soffits have been left as struck from the shutter, with a smooth finish. Inside, the main concourse is clad and furnished in teak, with a quartzite floor. All other areas are finished in white beech or plaster, with carpeted or linoleum floors (12). The extensive use of wood in furnishings, panelling and staircases is most attractive. It wears well, is easy to maintain, and gives the Library a feeling of luxury.

Assessment

1. This was one of the first libraries of its size in the United Kingdom to be fully air conditioned (seven of the eight floors are close to an acre in size). At the time the Library opened, the air conditioning was reportedly excellent throughout. Today, temperature and humidity control is unsatisfactory, and problems with condensation are encountered in winter.

2. The immense main concourse, two floors high and dominated by large concrete pillars 915 mm. × 460 mm., is not successful. The Circulation and Information Desks become insignificant in an area of this magnitude, and the general impression gained on entering the Library is of a daunting and somewhat unwelcoming building. The large central staircase, though beautifully constructed, adds to this initial impression. Possibly more care should have been taken by the architects to make this area more friendly and less imposing. Its monumental proportions do not achieve anything positive.

3. The design team used the cost limit optimally by creating a large enclosed area with small perimeter ratio and minimal internal subdivisions. The savings on structure were used in the internal finishes and services, which are of good quality throughout

4. Compared with a number of university libraries in the United Kingdom, Edinburgh University Library has particularly attractive staff areas (see Fig 8.6). This is a pleasant change from the restricted and overcrowded staff conditions seen in so many recent buildings. The Technical Processing area with its large windows and beautiful views is most attractive, and the administration offices on the First Floor are tastefully and luxuriously finished. The carpeting, good lighting, acoustic ceilings and sound insulation qualities of the beechwood strip partitions help to achieve this

5. It is unfortunate that, despite the severe height restrictions imposed on the building by the planning authority, extra height could not have been given to the 2.44 m. high stack and reading room ceilings. This would have increased flexibility and created a more pleasant environment.

6. The Edinburgh University Library building is the largest university library in Great Britain. The *Brief* to the architects was based on research carried out by the Librarian in both Britain and the United States of America, and it is a measure of his thoroughness that now, some eighteen years later, the building still fulfills so well the demands of a modern academic library. The building won the Royal Institute of British Architects (RIBA) Award in 1968, and the Civic Trust Award in 1969 (13).

Fig. 8.5 - Study Carrel

Fig. 8.6 - Acquisitions Department

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CHAPTER 9. NOTTINGHAM UNIVERSITY LIBRARY

Architects	Faulkner Brown, Hendy Watkinson, Stonor (Newcastle upon Tyne)	
Size	Total floor area:	10 035 m²
	Usable floor area	8 515 m²
	Balance:	1 520 m² (17,85% of usable)
Accommodation	Book capacity	542 000
	Reader stations	1 200
	Including:	
	carrels	436
	tables	493
	easy chairs	151
	seminar	80
	studies	40
Costs:	Net cost	£805 975
	Furniture fittings	£190 000
	Total cost	£995 975
	Cost m²	£80,32
Completed	August 1972	
Librarian:	R S Smith	

Faulkner-Brown was responsible for the architectural design of this particularly fine library. The *Brief* from the University stated that the Library was to serve staff and students in the Faculties of Arts and Social Sciences. Future expansion of the building was to be possible in anticipation of increased numbers of students and size of the bookstock. Users should be able to locate the main library services without aid, and be able to learn quickly the layout of the building as a whole. The building was also to be designed to allow maximum flexibility of use, with air conditioning

for the protection of the stock and the comfort of users and staff. Appropriate acoustic privacy was required so that most areas could be delineated by furniture rather than walls. It was expected that the majority of the book and periodical collection would be grouped in two divisions, Arts and Social Sciences, each served by a subject librarian located in the particular area. The reference collection was to be housed in close proximity to the catalogues, there was to be one central issue desk for the circulation of the stock, and a separate short loan collection was to be provided for the books most in demand by undergraduate readers (1).

In accordance with his philosophy on academic library buildings, Faulkner Brown reached agreement with the University on the qualities the Library should possess which would result in a building that was flexible, compact, accessible, extendible, varied, organised, comfortable, constant in environment, economic and secure (2). Thirteen years after completion, this impressive building still looks and feels new. It is an example of Faulkner-Brown's vision, and proof that the philosophy of this excellent architect, if adhered to as closely as possible, will produce a library that is an asset to any university campus.

Site and Access

The site was determined by the University in July 1969, and is well chosen (see Fig. 9.1). The building is positioned centrally on the tree filled skyline of the Campus, its simple form clearly visible from the ring road and approach from the City. The panoramic view of the City adds much architectural interest although it is not particularly attractive, dominated as it is by factories, terrace houses and the Ratcliffe Power Station. The Library building is a dignified addition to the scene. Its cleanly detailed concrete panels and dark, vertical slit windows enclosing restrained and well proportioned spaces are a cool contrast to the

miscellany of architectural styles which spread down the south-eastern slopes of the University site (3). Set at the highest point of the Campus, the Library stands between the Faculty of Social Sciences and the School of Education, and is close to the Faculty of Arts. In addition, it is on the route between halls of residence and the centre of the University. Beautiful trees exist on the site, and the Library has been positioned so as not to disrupt them. The building has enhanced the heart of the Campus by providing a natural meeting point at the focus of established pedestrian routes. An added advantage is the slight slope of the ground, which has enabled the main entrance to be situated naturally on Level Two, and the service entrance on Level One, with road access. The loss of the central open space now occupied by the Library may be regretted by some, but the choice of site was clearly the correct one. As Metcalf (4) has stated, "It is a better site than is generally available for a new library in an old university".

Extendibility

As may be seen from the Site Plan (Fig. 9.1), the location of the Library to the south of the site achieves two purposes. Firstly, it preserves the Staff Club and its beautiful surroundings without any overcrowding, at least for the forseeable future. Secondly, it allows lateral extension of the Library to the north, avoiding disruption of the existing pattern of trees. The precast panels of the north wall are designed so that they may be removed from the facade and re-used in the extended building (5). There is however little likelihood of Stages Two and Three, as indicated in Fig. 9.1, reaching completion, due to the restrictions placed on the size of university libraries by the university Grants Committee in terms of the "self-renewing library".

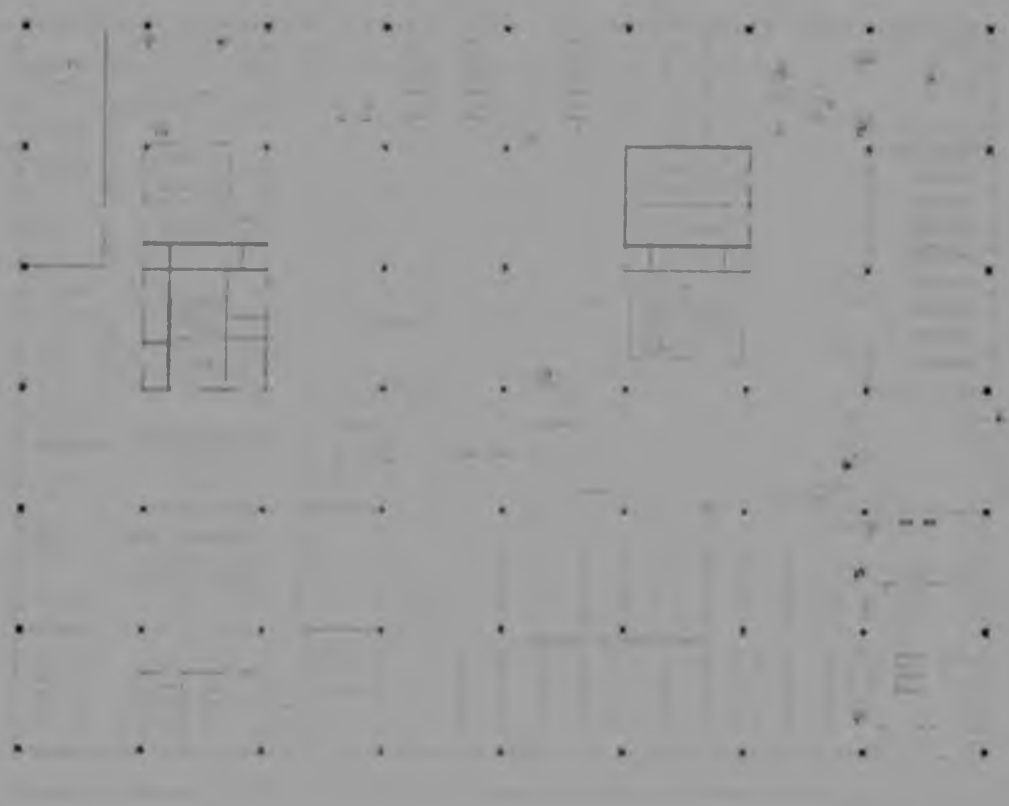
Fig. 9.1 - Nottingham University Library: Site Plan

(Source FAULKNER BROWN, HENDY, WATKINSON STONOR. Architects *Nottingham University Library*. Newcastle upon Tyne (n.d.), p.3.)

Fig. 9.2 - Floor Plan, Level One

(Source FAULKNER BROWN HENDY WATKINSON, STONOR, Architects *Nottingham University Library*, Newcastle upon Tyne [n.d.], p.4.)

Fig.9.3 - Floor Plan, Level Two



(Source FAULKNER BROWN, HENDY, WATKINSON, STONOR, Architects. *Nottingham University Library*. Newcastle upon Tyne: (n d.) p.5.)

Flexibility

The Library is on four levels, with the main floor at Level Two, and the users' entrance on the east side. The delivery and service entrance is on Level One, on the west of the building. Flexibility is of necessity reduced on Level One, where plant rooms are located, and where the Rare Book Store and Fumigation Room require isolated environments. The three upper floors are completely open plan except for the two core areas containing lifts, stairs, toilets and ducts.

Level One is a model of practical planning (see Fig. 9.2). It houses the Manuscripts Department, Special Collections, Audio-visual Room, Photographic Unit, Fumigation Room for the treatment of donations, a very useful general storage area, and a closed access storage stack with high shelving and good lighting. There is also a conference room, packing and delivery room, and binding preparation area.

At Level Two (Fig. 9.3), the principle elements of the Library may be clearly seen from the entrance: the catalogues, reference and bibliography area, Issue Desk, the main stairs, the Short Loan Collection and the coffee and smoking area. The foyer is large, with the Issue Desk set back to allow easy movement of traffic. Metcalf (6) has questioned the placing of this desk 30 m. from the main entrance, and this is a valid point. Despite the spaciousness of the entrance foyer, readers borrowing books from the upper levels must walk some distance from the stairs to have them issued, and then retrace their steps to reach the exit control. Had the desk been closer to the exit, traffic patterns would have been simplified, and fewer staff could have dealt with circulation, reserve books and exit control (see Fig. 9.5). Behind the issue desk are the technical processing departments, a staff rest room and a machine room. Only the Librarian and the Deputy

Librarian have separate offices. All other staff areas are open plan divided by shelving, the intention being that staff are accessible to users and that security of collections is discreetly increased. However, the staff areas appear to be overcrowded and are inadequately signposted.

Above the main floor are two levels of open access bookstack and reading areas, one primarily for Arts and the other for Social Sciences and Government Publications. Each level has space for approximately 187 000 books and 480 readers. Much care has been taken to provide a variety of reading environments. On these two floors open study carrels are located around the perimeter of the building, with tables nearby, and casual seating in the corner areas. Seminar rooms have been placed near the centre of each floor, and hence have no outside windows. To overcome this, Faulkner Brown has constructed one wall completely of glass, and this provides a view onto spaced bookstacks with windows beyond, thus successfully creating an impression of light and air not normally found in an inner room. The glazing was no more expensive than panelling, and curtains are provided should privacy be required.

It can be seen that with permanent walls reduced to a minimum, planning arrangements are extremely flexible. In his assessment of the Nottingham University Library Metcalf (7) states:

> One of the important factors in a functional library building if the long term view is taken is its flexibility. The University of Nottingham building is modular and is as flexible as a library building can be without adding unduly to its cost. As services demand change, as they are almost sure to do during its lifetime, shifts of equipment and space assignments can be made with comparatively little difficulty or expense. It is doubtful if this requirement has been

carried out more successfully anywhere in the United Kingdom

Interral Environment

The two upper floors of the Library have been enclosed by heavy masonry walls, relieved by dark vertical slit windows, spaced to give an economic arrangement of open carrels at the perimeter (8). An unusual external feature is the glazed cut off on each corner of the upper levels which add character to the building externally and internally provide attractive informal study areas In contrast the main floor is almost totally glazed It is shaded by the overhang of the upper levels and heat retention is further reduced by the use of brown tinted glass The lowest level is obscured somewhat by the slope of the ground but is also primarily glass Although the large amount of glass on Level Two takes account of the beautiful setting and also advertises the library within, the 5,5 m wide centilevred overhang reduces the area on this level by almost 500 m^2 Had this been available, it might have made possible a reduction in the depth of the building and thus saved on construction costs (9) However, had there been no overhang some form of screening would have been necessary to exclude heat and glare and certainly some of the beauty of the building would have been lost by its reversion to a standard rectangular shape

The internal environment of a deep planned building necessitates the provision of constant even illumination humidity and temperature control The skilful integration of heating, ventilation and lighting has led to an ingenious ceiling solution which is illustrated in Fig 9 5 The wasted dead space above the usual flat suspended ceiling has been used to form sculpted panels fitted between the structure and services (10) Lighting is contained within these panels, and the coffered pattern gives a good

level of illumination at the work surface (35 Lumens) and in the bookstacks. The arrangement prevents glare, so that louvres on the fluorescent tubes are unnecessary, and in addition, the tubes consume a relatively small amount of power. The coffered pattern gives additional height and volume to the reading and book areas, adding to the comfort of the user. It also has a greater sound absorbent effect than the conventional ceiling.

Air conditioning provides reasonably comfortable working conditions, but like most systems, it tends to break down. As there are no open windows, this has caused serious problems on occasion.

As regards power, the ground floor has cable conduiting on a grid basis, which allows total flexibility. Other levels have power points on the external walls, pillars and central core areas.

The furniture in the Library was custom-made, and generally designed to provide a wide variety of reading environments. It is strong, attractive and relatively maintenance free, and its quality seems to have dissuaded people from abusing it. Reading areas are comfortable, and indoor plants have been used very successfully in the creation of a congenial atmosphere. Although there is good provision for undisturbed study in quiet and isolated surroundings, the obvious popularity of the main floor reference tables and casual areas (see Fig. 6), as well as the informal seating by the large corner windows on Levels Three and Four, brings to question the provision of substantial numbers of individual study carrels (436). It would seem that many students enjoy and prefer the environment of the open areas and find the hum of background activity an aid to concentration (11). There is however a wide choice of reader stations providing for the preferences of individual students.

Economy

The architect has produced a deep rectangular, four storey block 59 m long, 46 m wide, and 16 m high, with a low wall/floor ratio of 0,4 : 1,0. Thus the cost of external walling is contained but the need for a constant environment tends to transfer cost from exterior elements to ventilation and electrical services. The suspended trough ceiling is economic in that it serves three functions It forms a flexible service distribution zone gives a measure of concealment to the bare fluorescent tubes, and provides for sound absorption Further acoustic treatment is provided by carpeting on the upper levels (12).

Nottingham University Library has a feeling of luxury about it, even though it was built within the University Grants Committee s financial limits and has been in existence a number of years A factor contributing to this is the easy maintenance finishes used throughout the building. On the lower level the internal walls are of brick, and the floor of white linoleum tiles which have remained bright and clear (see Fig 9 7) On the upper levels no plaster or paint is used on the walls Surfaces are either glass, teak panelling or brick The carpeting is of good quality and has worn well

Assessment

Hoare (13), present University Librarian, has made the following comments on the building

> "After many years of heavy use the building s design has been well justified. Some modification to layout has been made, but owing to the open plan layout on Levels Two, Three and Four, these have been easy. Open plan working seems to have been accepted by the library staff, but pro-

> vision for private consultation with readers sometimes seems a little inadequate. Total reliance on a mechanical ventilation system has led to difficulties when chilling or (less often) heating equipment has not operated properly. Readers find it an exceptionally good place to work. The design, high quality of finishes and easy maintenance undoubtedly contribute much to the Library's popularity and good reputation in the University".

From an aesthetic point of view Nottingham University Library takes advantage of an attractive natural environment. It is very pure in concept, and is a good example of open plan design. It has many satisfactory features found only too rarely in university libraries. The lighting is economic of good quality, and it is also attractive; the closed access bookstack on the first level is cost effective and convenient; the planning of space on this level is very satisfactory; the public service areas are well arranged; and the variety of seating provided for readers is very successful. The close collaboration of librarian and architect is evident throughout the building. The impression one gains is of spaciousness and efficiency, coupled with immaculate detailing and workmanship, proving that a good architect can combine excellent design with economy. Nottingham University Library remains one of the finest examples of British library architecture.

Fig. 9.4 - View of Exterior

Fig. 9.5 - Issue Desk from Main Entrance, Level Two

Fig. 9.6 - Reference Area, Level Two

Fig. 9.7 - Maintenance-free Surfaces, Level One

Fig. 9.6 - Reference Area, Level Two

Fig. 9.7 - Maintenance-free Surfaces, Level One

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CHAPTER 10. LOUGHBOROUGH UNIVERSITY OF TECHNOLOGY LIBRARY

Architects	Faulkner Brown, Hendy, Watkinson, Stonor (Newcastle upon Tyne)	
Size	Gross area:	9 263 m²
	Library	6 554 m²
	Department.	900 m²
	Balance:	1 809 m² (24 % of usable)
Capacity:	600 000 volumes	
Reader stations	800	
Costs	Building:	£2 500 000
	Furniture shelving	£ 600 000
	Total:	£3 100 000
	Cost m²	£ 270
Opened	September 1980	
Librarian	A J Evans	

In 1976 the University Grants Committee authorised the building of a new library at the Loughborough University of Technology. Work began in March 1978, and the Library opened its doors in September 1980. The building, which is named after the University's first Chancellor, Lord Pilkington, houses the Library on Levels One, Two and Three, and the Department of Library and Information Studies on Level Four. It is planned according to the concept of the 'teaching library', and there are common facilities and accommodation for both the University Library and the Department. Evans (1), the University Librarian, has outlined the reasons for a shared building.

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1 In terms of educational advantage, students will be in the environment of a vigorous library service, and may participate in many aspects of the Library's work without impairing its efficiency

2 Library staff will have the benefit of the expertise and professional interest of the Department, and Departmental staff and students can maintain close contact with the practical work situation.

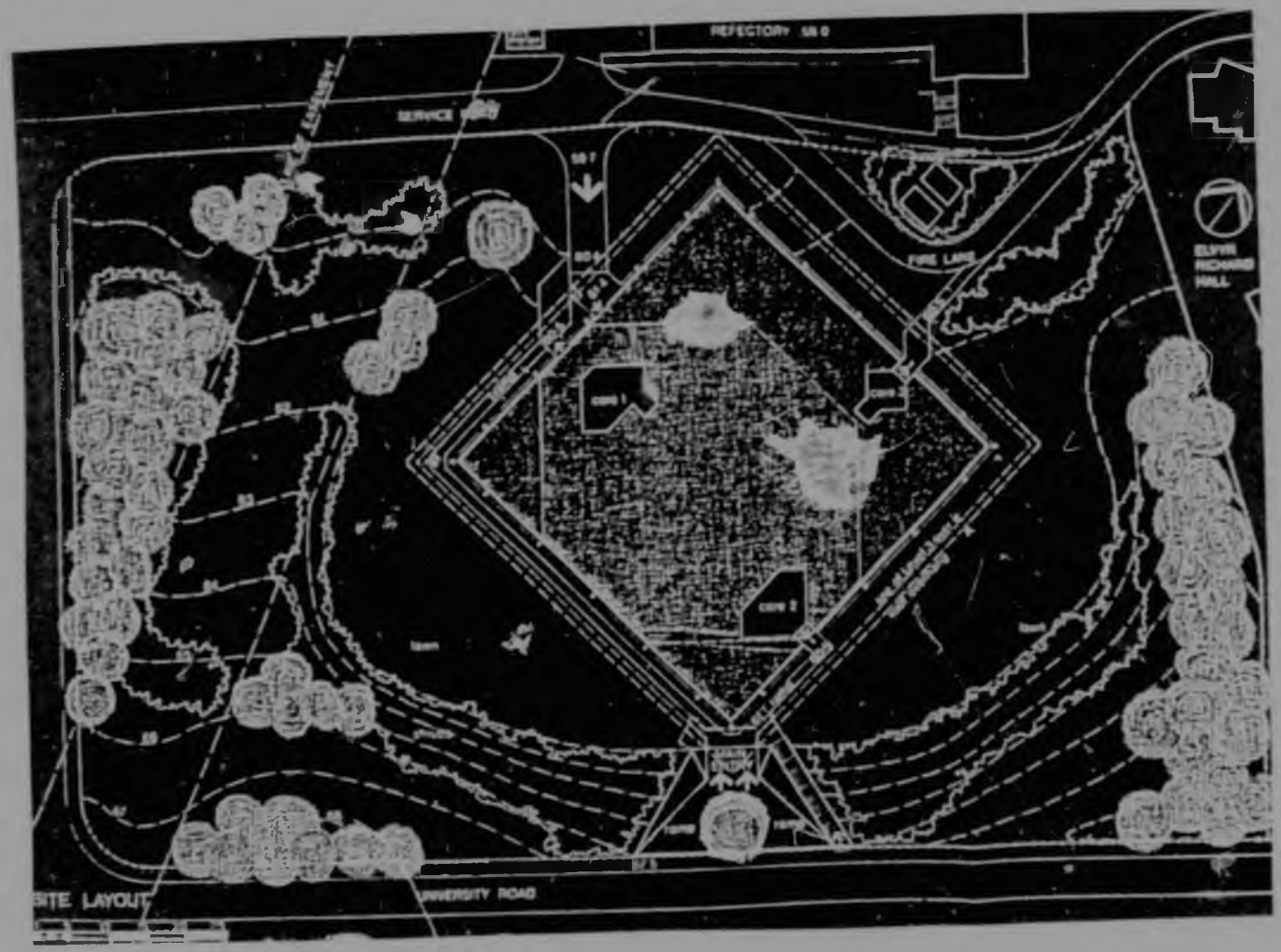
3 It is convenient for the Department to be close to the Library collection.

4 Many common needs may be met by shared accommodation and equipment thus maintaining economical use of resources

- shared seminar teaching facilities;
- increased bibliographical coverage and no wasteful duplication in a departmental collection;
- shared use of expensive equipment e.g. computer terminals.
- shared staffroom and services

The Library has been planned to provide for a University population of 5 500 students and 800 academic and research staff It will permit the growth of the present collection of approximately 380 000 to 600 000 volumes, with storage provision for 100 000 volumes elsewhere on Campus Although the space allocation was based entirely on University Grants Committee norms, these have proved to be adequate at Loughborough where the existing stock is still relatively small

Fig. 10.1 - Site Plan, Loughborough University of Technology Library



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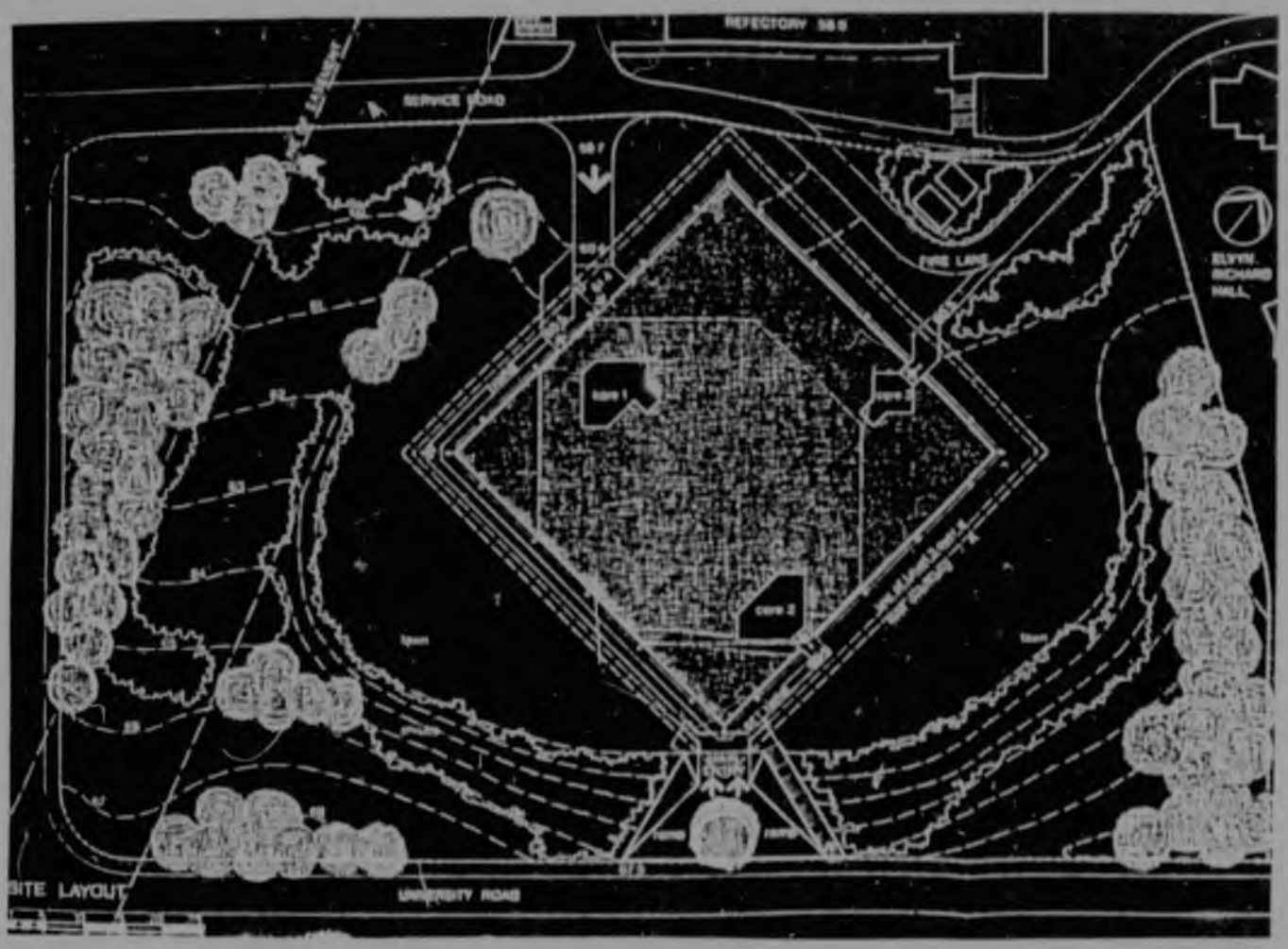

The Brief

The University specified a very adaptable building with a flexible layout and the possibility of expansion should this ever become necessary. It was to be inviting and functional rather than impressive with an atmosphere in all public areas that was appropriate for study without the need for oppressive silence. There was to be variety in the provision of reader stations, the layout such that users could easily identify their position, and all traffic in and out of the Library controlled from one point close to the Library entrance (2)

The firm of Faulkner Brown Hendy Watkinson and Stonor was appointed on the strength of Faulkner Brown s achievements at the Universities of Nottingham Cardiff and St Andrews In terms of the University s requirements for flexibility, comfort and convenience it was an excellent choice Faulkner Brown has designed an attractive, comfortable open plan library which is well used He has applied his ten desirable qualities to the design and layout of this building, although possibly to a slightly lesser degree than is the case at Nottingham University Library. The result is a functional and efficient building

Site

The Campus of the Loughborough University of Technology is widespread, and on first impression it is difficult to discern the centre and focal point of traffic and student movement However the Library is in close proximity to a number of teaching blocks and the refectory, and is well served by pedestrian pathways, roads and a large car park (see Fig 10.1) With a height restriction on the building, the architect has sunk the Library into a hole dug from the Campus hillside, the natural slope of the

ground reducing the amount of excavation necessary. The landscaping of the surrounding area is particularly successful.

Flexibility

A flexible building is one that may be altered and adapted easily without structural revision and with minimal changes to services (3). As in many libraries, Level One is less flexible than the other levels because of the necessity for locating machinery as well as delivery and loading areas at this level. As indicated on the floor plan (Fig 10.2) much space is permanently taken up by plantroom, air conditioning equipment, loading dock, binding preparation area and closed access stack. There are a number of solid walls in this area to isolate machinery and reduce noise. The remainder of Level One is entirely open plan and houses the University's main book and periodical collections in Science and Technology. User core areas are on the north and east sides of the building, that on the east being the major access point containing stairs, lift, toilets and emergency exit. There is an information desk situated close by. This is a very practical arrangement. The noise area is contained at the centre of movement, leaving the rest of the Library relatively quiet, and students requiring assistance may find it immediately on entering each level. The core on the west side is for staff use only.

An interesting feature of the Pilkington Library is its diagonal arrangement. Although square in shape, internal design emphasises the diagonal, adding interest to the layout and creating attractive reader areas. The wall separating machinery from stack and reading space on this first level runs from north-east to south-west, and the bookstacks run from the centre towards the periphery at right angles to this line i.e. from north-west to south-east. A number of soundproof study carrels and a seminar room are provided in the inner areas, while remaining study

stations are situated on the periphery. The atmosphere is a little oppressive in the inner areas on this level, possibly due to the existence of the dividing partition which blocks the view to the north and west. The architect has done his best to make this inner area as attractive as possible by avoiding a long, straight wall. He has created interesting shapes, within which are groups of casual chairs and tables.

Level Two is more flexible in that the only permanent features are the three user cores (see Fig. 10.3). Surrounding these are soundproof study carrels, seminar rooms, and on the east, an information desk. This level contains the main book and periodical collections in the Arts, Humanities and Social Sciences. Reader stations are located around the perimeter and in the central area between the two banks of bookstacks.

Level Three is the entrance level on which most library services are located, including the issue, short loan and inter-library loan desks, and reference, current periodicals, audiovisual and microform collections (see Fig. 10.4). Also on this level are staff areas such as technical processing and administration. Apart from the core areas all walls are demountable to maintain flexibility. Air brick partitions separate staff from public areas.

Level Four is much smaller than the three main levels of the Library, and is set in from the external walls of the building. It is thus barely visible from ground level, in accordance with the height restriction on all buildings on the Campus. Here is housed the University's Department of Library and Information Studies. The shape of the Department is octagonal, with staff and administrative offices situated around the perimeter, accessible via an internal corridor. The inner spaces are occupied by stack, laboratory and teaching areas. This section is less flexible than the other levels of the Library, but as it is a teaching department

stations are situated on the periphery. The atmosphere is a little oppressive in the inner areas on this level, possibly due to the existence of the dividing partition which blocks the view to the north and west. The architect has done his best to make this inner area as attractive as possible by avoiding a long, straight wall. He has created interesting shapes, within which are groups of casual chairs and tables.

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and is unlikely to be used for any other purpose, flexibility is not such an important factor

The ducting on all levels is visible and of unpainted aluminium. Apart from providing flexibility this method is the most economical way of meeting the strict fire regulations in the United Kingdom. Were the ducting to be contained within a false ceiling, expensive fire proof partitioning would be required at frequent intervals (4).

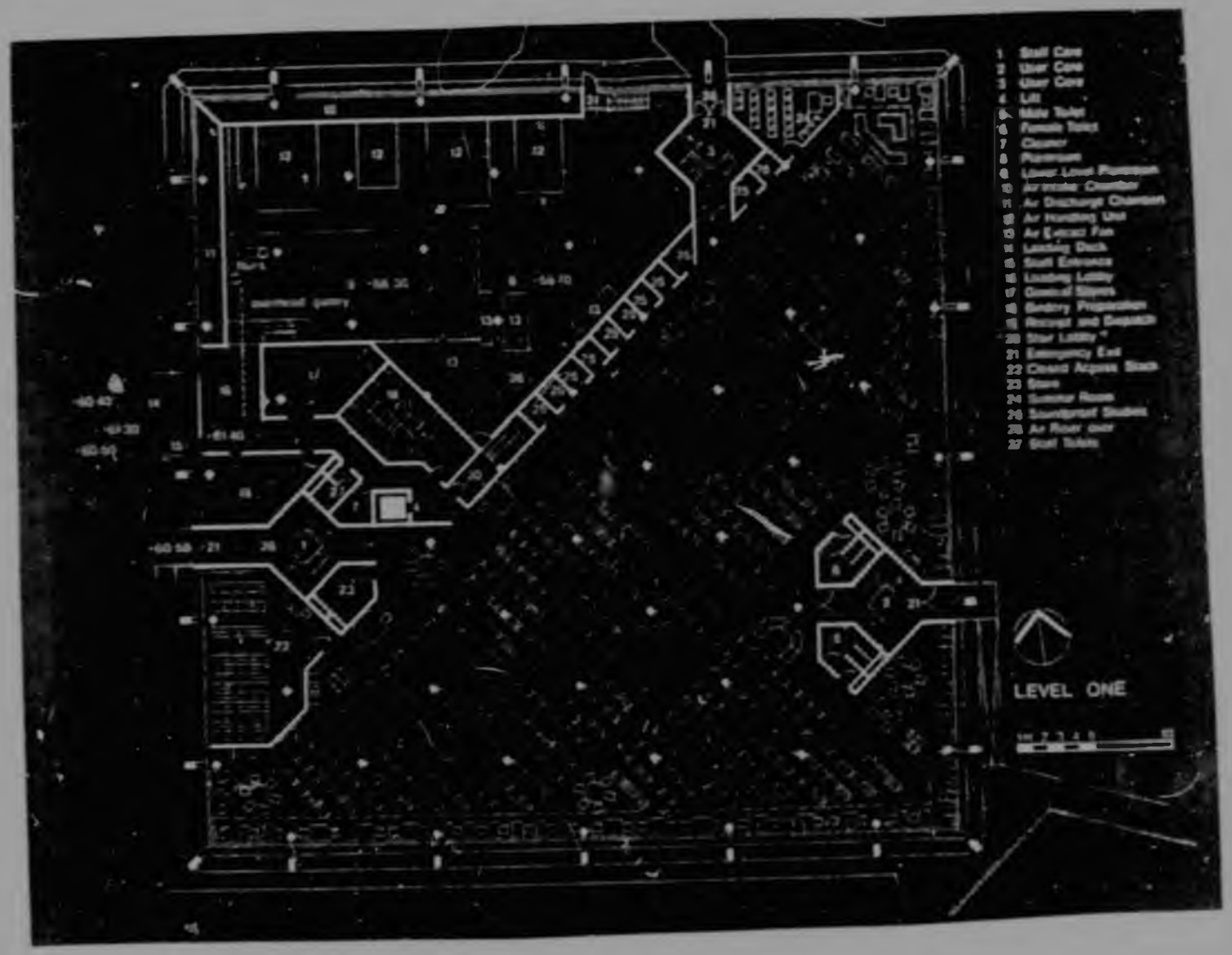
Compactness

Faulkner Brown has created an almost ideal building in terms of this quality The Pilkington Library with its inverted pyramid shape, is nearly as compact as the recommended cube. Level One is 50 m square increasing via Level Two to Level Three which is 60 m. square It functions very efficiently in that travel distances for readers staff and books are kept to a minimum Consumption of energy is also minimised (5).

Accessibility

Accessibility is good both from the exterior into the building, and from the entrance to all parts of the building The entrance is on Level Three due to the siting of the Library on a hillside, and this reduces vertical travel distances within the Library (see Fig 10.5) The entrance is unusual and has been the cause of much comment A wide set of steps leads to large double doors, which, unlike most public buildings are constructed of solid dark wood More reminiscent of an English manor house than a modern library, they are pleasingly different On entering, one finds a small, attractive lobby, decorated with colourful pot plants A second set of doors, constructed of glass leads into the Library. Signposting is very clear at this initial point of entry.

Fig. 10.2 - Floor Plan, Level One



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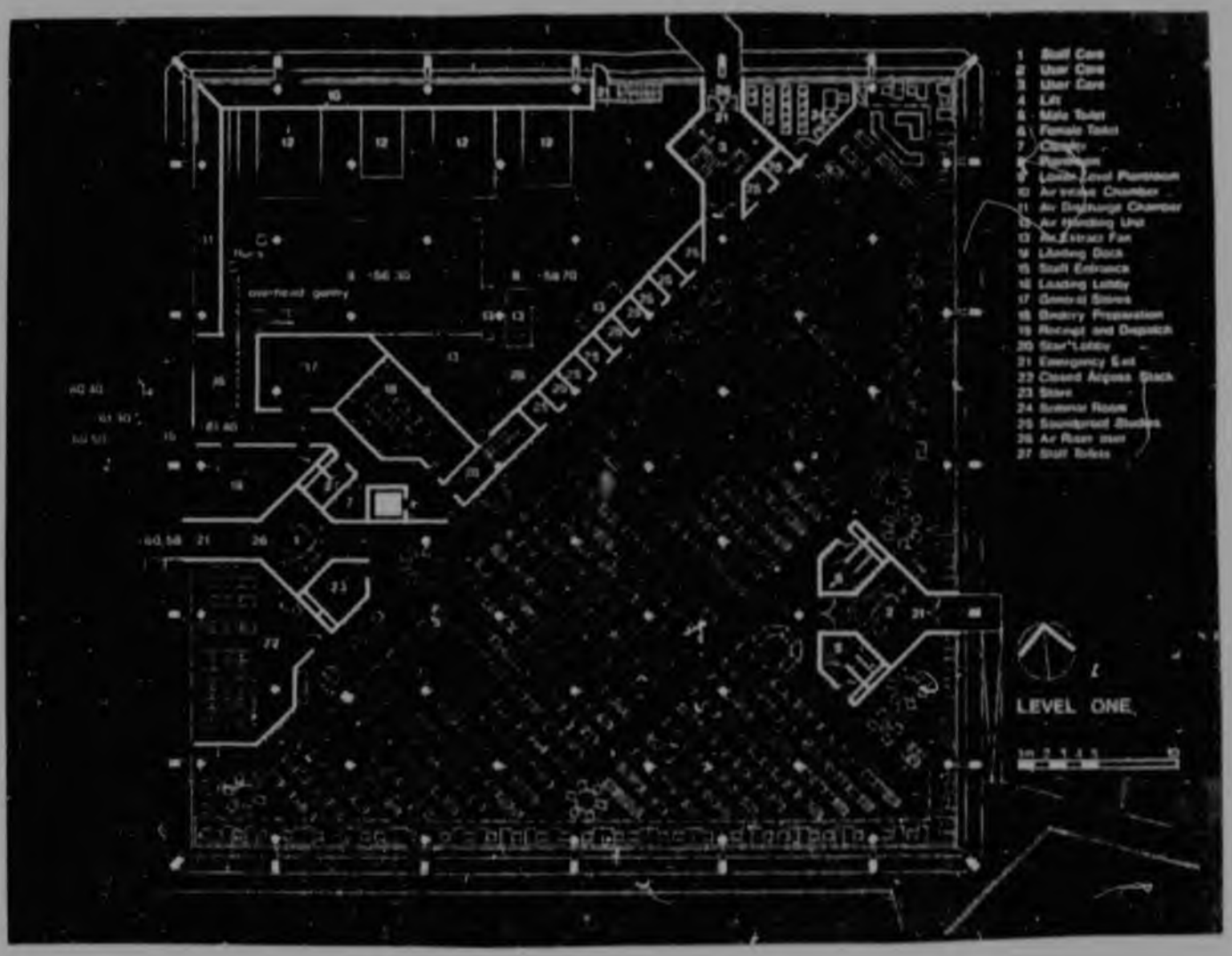


Fig. 10.3 - Floor Plan, Level Two

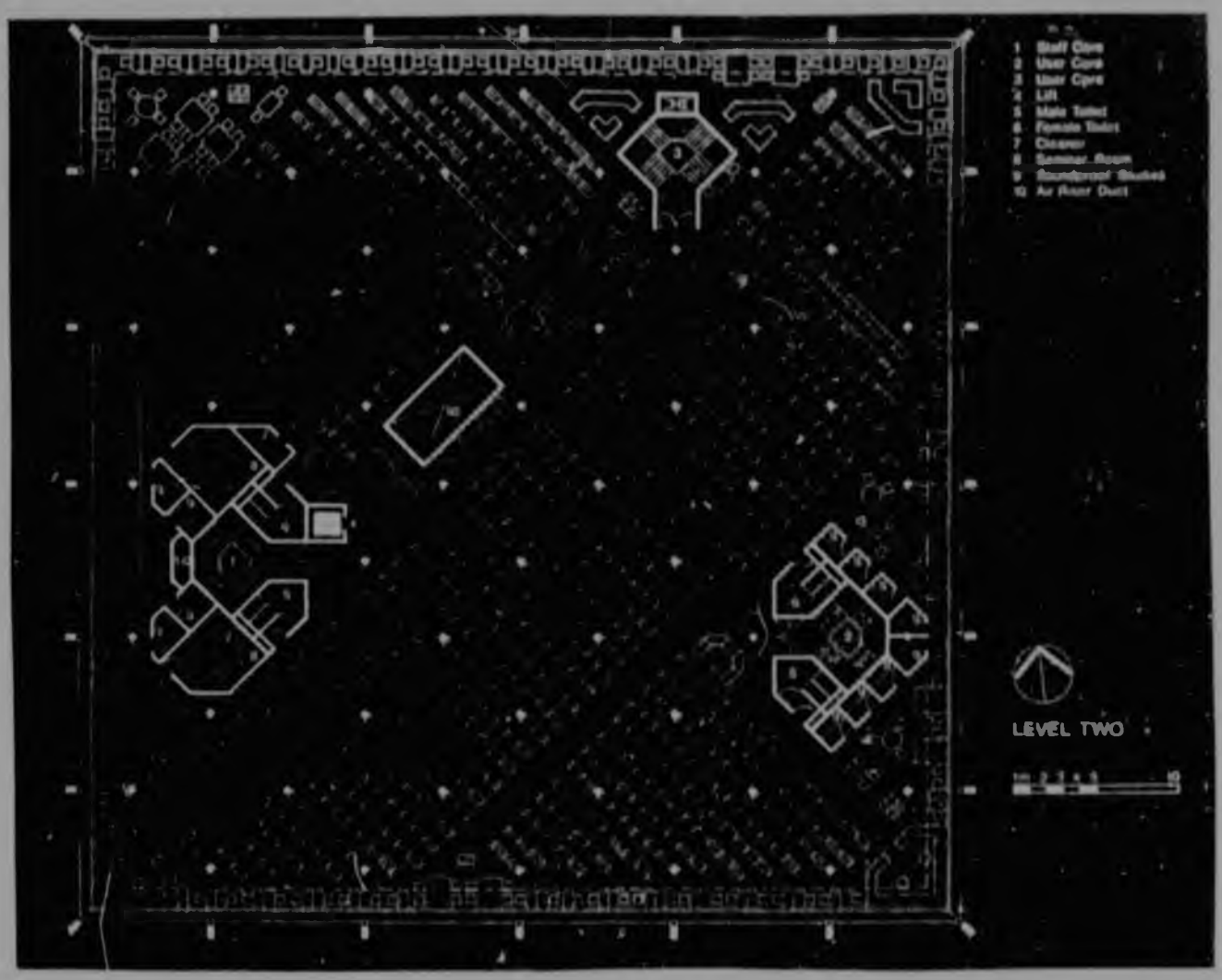
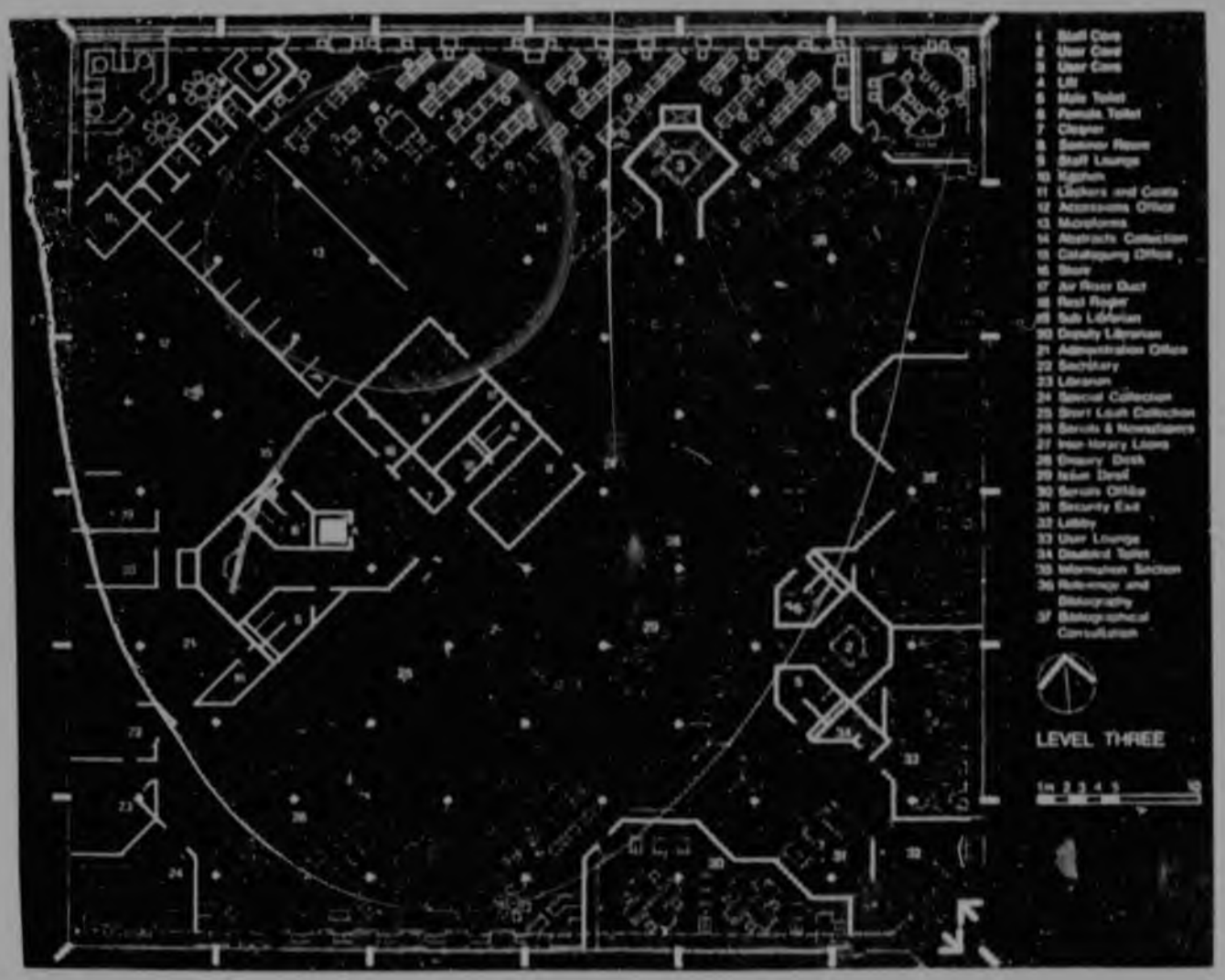


Fig. 10.4 - Floor Plan, Level Three



The main desk is set back from the entrance. One might question this in terms of security, but one cannot deny that it occupies a focal position on the main level, emphasised by a lowered ceiling over the area. Va is library services are located in close proximity to the main desk, and it is well placed in terms of traffic routes and the main stairs. Accessibility within the building is enhanced by the siting of user cores in the same place on each level, by the provision of information desks at these points, and by exceptionally good signposting throughout. The latter includes:

- signs hanging from the ceiling to indicate the bookstacks;
- floor plans on each level;
- large signs at the entrance and in the stairwells;
- printed guides to various aspects of the Library and its services available at all information desks.

The Library is organised so that most materials are visible, accessible and easily available. On Levels One and Two especially, the layout is simple. As far as the user is concerned, he will very soon be familiar with the Library. Level Three, because of the range of services offered, is naturally more complex. However, the fact that the unfamiliar user on entering the Library is brought immediately to the focal point of the issue and enquiry desk ensures that he is quickly directed to the relevant section.

Variety

Loughborough has moved away from the concept of large reading rooms and instead reader stations have, where possible, been located around the perimeter of the Library. This provides the user

with both a pleasant outlook and natural light A variety of study tables for one, two or four persons, together with open study carrels, lockable carrels, seminar rooms and informal seating permit the user to select the type of seating and level of privacy most suited to his needs Enhancing this variety of study areas is a bright and colourful choice of internal finishes (see Fig 10 7). The carpeting is russet in colour throughout the Library Internal joinery and furniture is of light oak and beechwood the most impressive example being the Issue Desk Shelving is metal of a light mushroom colour with beechwood end panels These are matched in the reference and abstract collections by specially fitted beech desk plates to facilitate ease of use of this material (see Fig 10.8) Contrasting with the pale wood and shelving is the bright red and green upholstery of the chairs The visual impact of the interior is largely determined by these contrasts, and further enhanced by the generous use of well stocked plant containers throughout the building

Comfort

Comfort in a library requires that attention be paid to air temperature, humidity, noise levels and lighting The Library is fully air conditioned with temperature and humidity levels controlled at an acceptable and comfortable level The floors are carpeted providing a large degree of acoustic absorption in the large open plan areas Staff work areas and those containing machinery are partitioned off from the public areas of the Library thus further lowering the noise level

Of interest is the lighting which consists of fluorescent tubes arranged in an arrow head pattern, running at right angles to the bookstacks This ensures a good level of illumination at the work surface, and also permits adequate light to reach the lowest level of the bookstacks Large windows around the perimeter of

the building permit much natural light to enter and make the peripheral areas particularly attractive to the user.

Security

The need for security has been kept in mind in the design of this Library. All movement in and out of the building is channelled through one entrance exit point, which is protected by an electronic book detection system and which is in full view of staff at the Issue Desk. Open plan permits a certain amount of staff control, although this is somewhat reduced on Levels One and Two by the angle of the bookstacks. There are emergency exits on three sides of the building.

External Features

The structure of the Pilkington Library consists of reinforced concrete floors and columns on a 6.6 metre grid, with raking columns at the perimeter supporting the overhanging floors and providing much of the character of the building (see Fig. 10.6). Lateral stability is provided by the stairs and lift cores. The main floor is level with the street, and is the largest. This floor overhangs the floor below to provide shading, and similarly with the level below that. External columns are fairfaced concrete, and spandrels and fascias white profiled aluminium sheet. The top floor is glazed in grey anti-sun glass fixed into a black anodised aluminium framework (6).

Assessment

In all, this Faulkner-Brown library is further proof of the architect's talent. It is well planned, functional, and contains many of the qualities needed in a university library. It is flexible. It is inviting and practical rather than impressive. The atmosphere

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in public areas is appropriate to study yet bright and cheerful. A wide variety of study spaces is provided, and signage is excellent. It is in fact difficult to fault this library in any major way. Possible minor flaws are:

- One of the support columns on the exterior of the building partially blocks one of the emergency exits;

- The inner areas on Levels One and Two are a little oppressive Maybe these areas could have been opened up by slightly reducing the length of the bookstacks;

- As is the case with Nottingham University Library the Issue Desk is some distance from the entrance, reducing security and staff control. Its location also requires users emerging from the main stairwell to walk back to the Desk before leaving the Library if they require books to be issued.

Despite these points, the Loughborough University of Technology has a Library that works, one in which the students feel comfortable Internally it combines warmth with practicality, while externally it is perhaps the most attractive building on the Campus The close proximity of the Department of Library and Information Studies seems to work well Finally, the Library will not be affected for some time by self-renewal because it did not have a large collection to start with, it has space for many years of growth in the bookstock

Fig. 10.5 - View of Exterior with Main Entrance

Fig. 10.6 - View of Exterior, South-East Corner

Fig. 10.7 - Study Area

Fig. 10.8 - Shelving in Reference Area

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CHAPTER 11. LIBRARY SPACE STANDARDS IN THE UNITED STATES OF AMERICA

The measurement and utilization of college facilities in the United States has long been the concern of planners and administrators. Firstly, a need was felt for guidelines to be used in the total cycle of facilities planning in institutions of higher education. Secondly, expansion of colleges and universities in the 1950's and 1960's had resulted in enormous increases in physical plant investment. As the cost of providing facilities became more burdensome, the need for more effective planning and utilization became an important consideration not only of the colleges themselves but also those called upon to provide the capital funds. This resulted in a need for increasingly explicit justification of proposals for the reallocation of existing space and the construction of additional space (1).

In response to these needs, the Planning and Management Division of the Western Interstate Commission for Higher Education (WICHE) in Colorado, in cooperation with the American Association of Collegiate Registrars and Admissions Officers, produced a series of manuals entitled *The Higher Education Facilities Planning and Management Manuals (1971)*. Although work had been done on various aspects of the problem e.g. Russell and Doi: *Manual for Studies of Space Utilization in Colleges and Universities* (1957); Smith *College and University Space Requirements* (1954); Bareither and Schellinger: *University Space Planning* (1968), there were no comprehensive guidelines on the whole range of higher education activities. The advent of the WICHE programme in 1969 rectified this situation.

Philosophy

The manuals are directed primarily at new and or smaller institutions, both public and private, although they are also expected to be useful to planners in larger institutions. Basic to the philosophy is a belief that the existing diversity in American higher education is healthy and should be nurtured. Thus none of the procedures is so rigid as to enforce homogeneity or to preclude individuality. Wherever appropriate the procedures call for the input of factors which represent individual institutional policy. In addition, they have been kept as simple as possible. Because collection and manipulation of data is an expensive and time consuming operation, those data typically collected and maintained in institutions are used whenever possible.

Structure and Organisation

Number Four of seven manuals deals with academic support facilities, primarily the library. Two sets of procedures are discussed:

- Evaluating the capacity of existing facilities.
- Techniques to be used in projecting future requirements.

Both are concerned with the three main types of space found in libraries – stack, study, and staff, service and processing space. Keeping these in mind, the following information must be obtained in order to evaluate *existing* space (4):

- capacity of existing library stacks.
- capacity of existing library reader facilities.
- capacity of existing staff and service facilities;

- existing size of library collection in bound volumes;
- existing reader population (full-time equivalent or FTE);
- existing number of library staff requiring space.
- existing assignable square feet (ASF) of stack space;
- existing ASF of reader space.
- existing total number of reader stations;
- existing ASF of office and library processing and service space.

In addition, the following utilization assumptions are required:

- stack density criterion expressed as bound volumes/ASF;
- percentage of FTE students to be provided with reader stations;
- average number of ASF/reader station;
- average ASF/library staff member requiring space.

The procedure uses the above information in order to establish utilization rates, the capacities of the various facilities, and the percentage of existing reader stations to current FTE student enrolment as opposed to the desired number. These evaluations can be very helpful in pointing out any imbalances in the various types of space, and in indicating any excess of space in one area which could be converted to meet a need in another.

For future building projects the following information is required in order to *project* space requirements (5):

- the data mentioned above regarding existing facilities;
- projected additional ASF of stack space required;
- projected additional ASF of reader space required;
- projected additional ASF of library staff and service space required;
- projected size of collection at each planning stage;
- projected reader population (FTE s) to be served at each planning stage;
- projected library staff requiring space at each planning stage;
- ASF of stack, reader and staff space expected to be in use at each planning stage.

Using this information, the projected stack space, number of reader stations, and staff and service space required at each planning stage may be calculated. The projected size of the library collection may be found by estimating expected size or by using estimated growth factors.

To assist in calculating the necessary data, unit areas have been established for the three main library space types. Unit area values vary widely with the type and density of stack shelving, the types of reader stations, and the composition and processing operations of staff and service functions, yet they provide useful guidelines to library planners.

Table 11.1 General Criteria for Stacks (6)

Type of stack area	Average bound volumes ASF	Average ASF/ bound volume
Open stack reading room	8-10	0,125-0,10
Open stacks	10-12	0,100-0,081
Closed stacks	12 15	0,083-0,067
Compact storage	40-60	0,025-0,017

The above illustrates an average situation, and relates to bound volumes (or equivalent). The University of California (7) has calculated space allowances for more specific types of library materials

Table 11.2 - University of California Space Norms

Type	unit	asf/Unit
Stacks (single-face section):		
Books	125 volumes	8,7
Documents, pamphlets	1 000 items	8,7
Microfilm (boxed)	400 reels	8,7
Newspapers (unbound - display)	7 titles	8,7
newspapers (back files)	9 volumes	8,7
Periodicals (unbound - display)	15 titles	15,0
periodicals (boxed)	30 titles	8,7
Recordings	500 records	8,7
Reference books	75 volumes	15,0
Alternate to stacks:		
Maps	1 000 case	42
Microfilm (reels)	400 case	11
Slides	5 000 case	17

Values generally range from 0,083 to 0,1 ASF volume. If 'volume' is defined as a bound volume, the value of 0,1 ASF/volume is appropriate. Lesser values are achieved by calculating 'equivalent' volumes for other types of material. However, the calculation of equivalents is so complex as to be inappropriate. It is therefore suggested that a planning criterion of 0,1 ASF/bound volume be used, recognising that this assumes a mix of library resources.

Reader Station Unit Floor Areas

These depend largely on the type of reader station, the design of the furniture and allowance for internal circulation. The following table gives the average areas for various types of stations:

Table 11.3

Type of station	ASF station
Open tables and chairs	20 - 25
Small carrels	25 - 30
Research carrels (open)	30 - 35
Enclosed carrels	40 - 70
Audiovisual carrels	35 - 45
Typing stations	25 - 35
Reading lounges	25 - 35
Conference rooms, seminar rooms	20 - 25

Generally, the smaller the area of a study room, the larger the area per station, due to the higher proportion of internal circulation space required. In general, a value of 25 - 35 ASF station is appropriate. The number of stations to be provided is determined on the basis of a policy decision. The minimum requirement is generally 25% of the user population.

Staff and Service Unit Floor Areas

The total staff and service facilities of a library may be expected to range from 25% (for a smaller library) to 18% (for a larger library) of the combined stack and reader floor area. If library office space requirements are calculated independently, then a value of 5% of the sum of stack and study area is recommended. The University of California (8) has established unit area allowances for staff work stations as follows:

Table 11.4

Staff work areas	ASF work station
Acquisitions	100
Administration	120
Bindery preparation	250
Cataloguing	110
Circulation	120
Data processing (including equipment)	120
inter-library loans	100
Periodicals	120
Photocopying	100
Receiving and Mail	300
Reference	120
Special collections	120
Staff room	25
Typing pool	75

In the California approach an additional 5% is added to the sum of all calculated stack, reader and staff work areas to allow for additional service facilities such as lobby, public catalogues, display and storage space.

Classification of Space

Basic to the procedures outlined above regarding evaluation of library space is the assumption that library space and all other kinds of space contained within college and university buildings have been defined and classified, so that data and information are comparable among institutions and at the state and national level. The National Center for Higher Education Management Systems at WICHE has compiled a manual entitled *Higher Education Facilities Inventory and Classification Manual (1972)* which provides the classification systems necessary for quantifying building areas in ways that are meaningful and useful for planning at all levels of resource allocation. The authors have divided space up into a number of categories library space falling primarily into category 400 - study facilities Definitions are provided to clarify areas. Offices that serve library activities are included in category 300 - office facilities, rather than in category 400 (9).

410 - Reading study room

A room used by individuals to study books and or audiovisual material. Included are study carrels, seminar rooms within the library, study stations, and also reading rooms found in halls of residence or academic departments.

420 - Stack

A room or portion thereof used to provide shelving for library materials Included are library stacks, but not bookshelf space in classrooms and offices.

430 - Open stack reading room

A combination of reading room and stack.

440 - Processing room

A room which serves a reading study room, stack or open stack reading room as a supporting service. Included are areas generally used to house catalogues,

circulation desks, book binding, and audiovisual playback equipment. It does not include office space for staff.

455 - Study service
A room which directly serves reading study rooms, stacks, open stack reading rooms or processing rooms as an extension of the activities in those rooms. Included are locker space and coatrooms.

These categories and definitions have been utilised in the South African adaptation of this system - the South African Post-Secondary Education Information System (SAPSE), which has been described in Chapter 4.

Comments

Although procedures for the evaluation and projection of space are a useful aid to planners, they are not entirely satisfactory. They tend to ignore the enormous differences among academic fields of study in terms of their relative reliance on library materials and the scope of collections needed to support them. They also obscure differences in student characteristics and academic programmes at different institutions.

Projections for future growth depend on a number of factors such as the state of the collection in certain subject fields, the rate of obsolescence, possible development of new courses, changes in educational techniques, various rates of publication in different fields, and finally the financial resources of the individual library. Due to the complexity of these combined factors projection is usually done on the basis of average percentage increase in the number of volumes acquired (and removed) annually.

The number of readers to be accommodated in a library also varies widely with the institution. The generally adopted standard of 25%

obscures diversity of library use generated by different types of courses as well as by types of readers e g many law schools in the United States require that seating be provided for up to 65% of the student enrolment. In projecting reader station requirements one needs to look carefully at the user population. The authors of the WICHE project suggest that a combination of the projected student population by level of student and field of study, the distribution of faculties and other user demands (e.g. public), may be used as a basis for estimating demand for library reader facilities (10).

It is accepted that in size content and scope of functions, the range of variance among libraries is as great as that amongst the colleges and universities themselves. Although the WICHE manuals provide guidelines it is emphasised throughout that they are not to be construed as planning standards, and that "..planners should not hesitate to deviate from these procedures as changing conditions and requirements dictate" (11) However, physical facilities are one of the major considerations in the higher education decision making process. It is desirable that decisions regarding current operations and future directions of the institution be made with the benefit of accurate and comprehensive information in this area. The WICHE system provides a means of standardising this information, and it is in this respect that they achieve their main purpose. At neither the state nor the national level are they imposed upon institutions in a restrictive manner.

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CHAPTER 12. UNIVERSITY OF NORTHERN IOWA LIBRARY

Architects:	Thorson, Brom, Broshar, Snyder (Waterloo, Iowa)
Interior design:	Westburg, Klaus Associates (Minneapolis, Minnesota)
Librarian:	D O Rod
Total floor area	16 275 m²
Shelving capacity	700 000 volumes
Reader stations.	1 453 (total capacity of 1 550)
Facilities include	11 Student group studies
	23 Faculty studies
	7 General lounges
	3 Smoking lounges
	2 Typing rooms
Total cost:	$4 450 000
Cost/m²:	$273 (including fittings)
Occupation date	Unit 1 September 1964
	Unit 2 - January 1975

The University of Northern Iowa is located in spacious grounds on the outskirts of Cedar Falls Iowa The University serves this primarily agricultural state, and consequently approximately 95% of its 11 000 students are local

Site

The Library is situated in the centre of the Campus with the Students Union to the east, the Campanile to the west, and academic buildings to the north and south Student residences are on the perimeter of the Campus. The site of the Library is ideal

for projected development of the University. At present orientation is towards the east with the main entrance in close proximity to the Union (see Fig. 12.1). Accessibility is good from all points on the Campus.

The University of Northern Iowa Library, like many other academic libraries has occupied numerous locations on the Campus since its inception in 1876. In 1964 Unit 1 of the present Library building was occupied. Unit 2, completed in 1975, is designed to accommodate present and continuing needs.

Building Space Summary (1)

Unit 1 building total:	8 668 m²
Volumes:	275 000
Reader stations	1 100
Cost:	$1 600 000
Units 1 and 2 building total:	16 275 m²
Volumes.	700 000
Reader stations:	1 550
Cost:	$4 450 000

Both units were built at times of recession and hence the bids tendered were low. Today, at the current cost of $750 - $1 025 per square metre in the United States (1985), the building would cost approximately $16 000 000.

Brief

Rod (2), Librarian at the University of Northern Iowa and consultant on approximately fifty building projects in the United States, listed the four major concerns of the Library in his brief to the architects:

Fig. 12.1 - University of Northern Iowa Library: Site Plan

(Source: THORSON, BROM, BROSHAR, SNYDER, Architects, *University of Northern Iowa Library*, Waterloo, Iowa: [n.d.], p.4.)

- supporting the instructional and research programmes of the institution;

- aiding the faculty (within budgetary limitations) in their research and other scholarly activities;

- encouraging students to acquire and develop lifetime learning skills and habits;

- participating in reciprocal service with the larger community, both state and national

The *Brief* was a one hundred page document providing the architects with detailed information on requirements, collections, spatial relationships, major elements and circulation statistics. Tables of growth over ten years were also provided (estimated at eight percent compounded annually).

The overall success of the first unit was a major design constraint on the architects. The *Brief* stated that the very satisfactory module size should be continued in the expansion, and that the functional layout of the initial structure worked so well that the same basic arrangement and pattern of relationships should be retained (3). Its intention was thus to spell out additions, expansions and refinements of an approved building pattern.

Extendibility

The original 1964 structure was built so that extension could take place both horizontally and vertically. In order to retain the necessary services on the main level of the building and to preserve good functional relationships among these services, initial expansion was horizontal to the west with the addition of a unit

almost the same size as the existing structure. Future expansion will be vertical.

Throughout the building the staircases and lounge areas have a live load capacity of 4 79 kN m^2 while all general floor areas as well as the existing roof have a capacity of 6 kN m^2. Although the first unit is able to carry only one additional floor, Unit 2 has footing and columns of sufficient strength to support several additional floors These would ultimately be built to contain lesser used material rather than the construction of an underground basement or annex It is envisaged that a fourth level will be constructed in the early 1990 s

Flexibility

The original building was modular and highly flexible, with supporting columns 7,78 m apart centre on centre, in both directions, thus leaving 7 32 m clear between columns. This module size has been continued in the 1975 extension. By keeping the columns under 450 mm in diameter, it has been possible to bury them in walls and stack ranges, thus eliminating any sense of a maze of columns which could so easily have resulted. The present expanded library is on three levels with the main floor at Level Two Figs 12.2, 12 3 and 12.4 indicate the floor plans. The Library is based on open plan design, and with the exception of core areas containing stairs, lifts and toilets, all walls and partitions are demountable.

Much care has gone into the design of the major elements of this Library. The main floor is outstanding in both its logical arrangement and ambience The entrance lobby is spacious and inviting, with a large circulation desk area located immediately to the left on entering. Ahead of it is an attractive, informally furnished new book display area with wooden island shelving and

bright carpeting and seating It is tastefully decorated with small modern sculptures and indoor plants Apart from breaking the monotony of a large lobby, this provides an inviting waiting area for patrons near the entrance Wall space has been utilised for the display of paintings, pottery, and other art forms to give added attractiveness and function. To the right of the entrance is the main staircase, one of the highlights of the building The architects wished to build a spiral staircase, but Rod did not agree from a safety point of view The result is a compromise; a beautiful eliptical stair with steps of even width, and the stairwell finished in deep red glazed brick The eliptical shape is emphasised by an artwork hanging in the stairwell - a magnificent woven tapestry in natural earth colours The lobby provides the patron with his initial impression of the Library, at the University of Northern Iowa Library this is overwhelmingly positive.

The administrative suite is located in the south-east corner of the building (see Fig 12.3), and contains offices for the Director and two Assistant Directors, a small conference room to accommodate twelve people, a reception and general office area storeroom, book-keeping room, and staff lounge The latter is easily accessible from both the administrative suite and the Technical Processing Department The office of the Assistant Director (Public Relations) and the conference room are directly accessible from the corridor outside the administrative suite

The Readers Services Department is the central information point of the Library, consisting of a sizeable core of reference librarians and support personnel surrounded by such major tools as the catalogue, reference and bibliographic collections, indexes, abstracts, current journals, newspapers and micro materials. The central service desk of the department is clearly visible to the library patron immediately on entering. In the vicinity of the

reference desk are eight offices for staff, a workroom and a storage room.

The catalogue is visible from the lobby but removed from the main traffic lanes. It is a heavily-used area, tends to be noisy, and thus has been isolated to a certain degree with acoustical partitions which confine sound yet retain visibility.

The reference collection itself consists of approximately fifteen thousand volumes contained in eighty double faced sections of standard wooden shelving. An aisle width of 1.22 m. is maintained between the ranges. The current periodical area has been given identification and control through skilful placing of shelving, yet it retains an inviting, informal character (see Fig. 12.6).

Also associated with the Readers Services area are a room equipped for blind students and a room containing useful items such as staplers, calculators, guillotines and punches. This 'tool room' has proved immensely popular with students.

On the south-west of this main level is the Technical Services Department, conveniently located near the catalogue, bibliographic centre and delivery entrance, and not too far from the Circulation Department. There is easy movement of parcels from the loading dock to the Acquisitions Department which deals with both books and periodicals. The Mailing Room is well planned and very functional (see Fig. 12.7). Offices within Technical Processing are partially glazed to ensure a pleasant interior yet retain privacy. Further elements in this area include a stationery room, computer room, and storage room for gifts and minor items of equipment.

Also located on the main level is the Special Collections Department, which includes the Archives. There are lockable wall

bookcases, other appropriate storage facilities, and seating for approximately ten readers.

The first floor, on the lower level, provides a large area for stack and study as well as several services. Reserve Books are in the area immediately facing the main staircase. Computer terminals are located behind the Reserve Book area; these do not belong to the Library but space is provided for their use by students. The Youth Collection, containing materials typically found in school libraries, is a long narrow room on the east side. The Department of Library Science is located in the south-east corner, and operates independently of the Library.

The third floor, or upper level, is primarily stack and study space. However two separate collections are housed on this level. Documents and Maps are located on the north side. This is a large area with a service counter, two staff offices and a workroom serving both collections which are contiguous but separately identified. The second is Art and Music, where the physical format of the materials and the need for specialized equipment for their use has necessitated separation from the general bookstock. There are two staff offices, a workroom, service counter, informal group listening rooms and a number of informal reader stations. The network of conduits and raceways makes possible the connection of all listening stations to a central console behind the service desk.

Generally the Library is well planned and very adaptable. In the stack areas aisle widths are 1,07 m. Rod believes that wider aisles encourage more browsing and greater use of the Library's stock. However, they take up space, and it is likely that they will have to be reduced in the near future. Fortunately this will not affect lighting too adversely. Only half the available lights are used at present, and the level of light could be raised if they were no

longer centred on aisles. To cater for automation a false ceiling has been installed, allowing a space of 460 mm. for cabling throughout the Library.

Internal Environment

The State of Iowa experiences extremes of climate in summer and winter, and much care has been given to the provision of a comfortable internal environment. The air conditioning system is on the whole very satisfactory, with rapid air change, absence of drafts, and quiet operation. Better humidity control and an improved exhaust system in the smoking lounges are possible areas for improvement.

The building contains narrow slit thermopane windows on the upper levels, and a 1.22 m overhang to protect the large expanse of glass on the main level. On the west wall the architect has managed to take advantage of the fine views of the campus without introducing too much heat and glare in summer. The primary purpose of fenestration continues to be aesthetic and psychological, with the provision of natural light a secondary and relatively unimportant consideration. The polarized fluorescent lighting used in Unit 1 was a very successful feature. However, it was thought that it would be desirable in non-work areas to introduce other types of lighting in order to give subtle contrast to a building which would eventually be sizeable. Rod believes that different people need different light levels. Lighting in the extension ranges from seventy foot candles down to forty in some areas. Small round incandescent lights are used in the central passageways and reference areas, and reading stations in the latter areas are very popular. Troffered recessed lights are used in large stack areas. An attempt has been made to create a variety of moods in a structure which is by its nature very orderly and controlled.

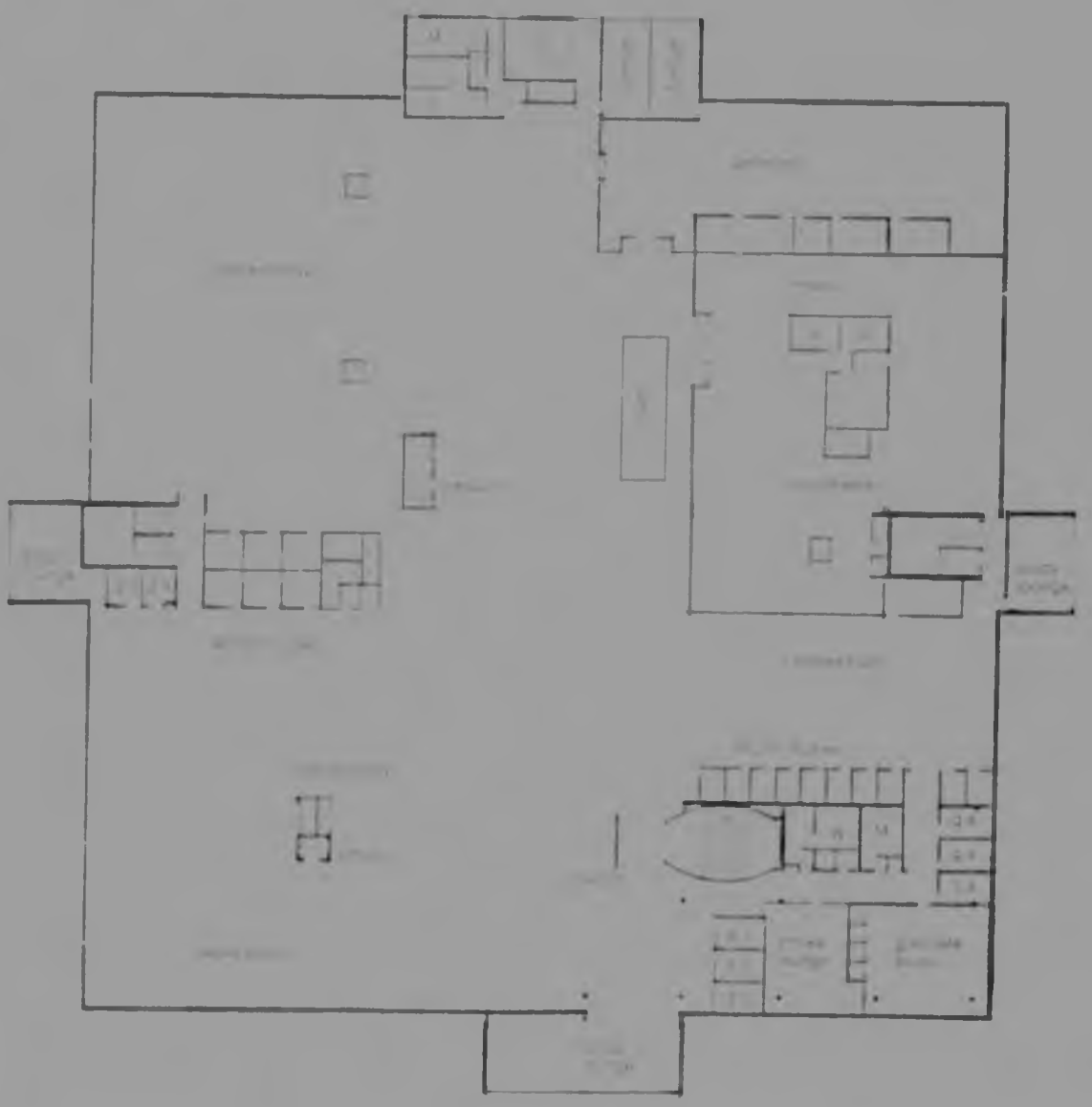
Fig. 12.2 - Floor Plan, Level One

(Source: *UNI Library Handbook*. Cedar Falls, Iowa: University of Northern Iowa Library, 1983.)

Fig. 12.3 - Floor Plan, Level Two

(Source *UNI Library Handbook*. Cedar Falls, Iowa: University of Northern Iowa Library, 1983.)

Fig. 12.1 - Floor Plan, Level Three



(Source: *UNI Library Handbook*. Cedar Falls, Iowa: University of Northern Iowa Library, 1983.)

To maintain a feeling of spaciousness, the original ceiling height of 2,9 m. has been continued into the extension, with some improvement in the acoustic panels. The earlier panels have painted surfaces which eliminate most of the acoustic quality and shows wear easily. Floor covering is predominantly carpeting, which provides good acoustical control and cuts down on maintenance costs. In areas where carpeting is not feasible, vinyl floor tiles have been used. In the treatment of walls both wood panneling (walnut and birch) and vinyl wall coverings have been used. Areas around recessed drinking fountains have ceramic tiles, as do the cloakrooms. In general, both wall and floor coverings are in keeping with the function of each particular area.

Seating is provided for 1 453 readers. A concentration of informal seating is to be found in the current periodical and lounge areas, while a variety of seating for more serious study is provided in other areas of the Library. There are eleven group studies catering for groups of from four to six students. In general they are located near the main staircase on each level. Special attention has been given to acoustic control of these studies, while a glass panel in the door provides visual control. Twenty three faculty studies are provided at present. These are very popular and twice this number could have been well utilised. They are located primarily on the third level, have individual temperature control, and are ventilated to accommodate smoking without any escape of fumes into adjacent areas. These rooms are assigned to academic staff for periods of up to a year.

Study lounges are located on each level. These are attractively furnished with a variety of seating, and provide an excellent study environment (see Fig. 12.8). In addition, a smoking lounge is provided on each level, in proximity to the cloakroom complexes. On the main level there is a pleasant study lounge for faculty.

These informal areas are very popular with staff and students, and are well used

The Library has two rooms designated for the use of graduate students Each has a number of lockers which may be assigned to individuals for storage of library and personal materials. Typing facilities are also provided for the use of students

Interior design consultants were hired to decorate the interior of the Library, and the results are particularly successful. These specialists compiled sample boards of different colour and texture combinations for carpeting, fabric wall coverings, furniture designs, paint colours and wood finishes Primary colours were chosen for the furniture orange, red, purple, blue, green, ochre and yellow A rust-coloured carpet was selected for the major part of the Library with a brown shaggy carpet in the staff lounge Curtaining is also a rust colour, but of very light sunfilter fabric so as to give a feeling of privacy without blocking visibility At the time of the expansion, extensive remodelling and redecoration of the existing library took place, so that now the Library appears to be continuous in design appearance and atmosphere.

Economy

The architects have built a library of ideal shape from the point of view of economy. A cubic building is efficient in the use of fuel and energy In an academic library where long hours of artificial illumination and air conditioning are required, this is an important factor, and especially so in the University of Northern Iowa Library in summer when the air conditioning plant has to deal with outside temperatures of 30° Celsius or more The heating requirement in cold weather is not such a great consumer of energy in a deep plan building (4).

Security

An electronic book detection system has been installed at the main entrance. As regards fire, the Library has been fitted with smoke detectors, and should one of these be activated, an alarm will sound initially in the Campus Security Office and thereafter in the City Fire Department. Security staff are able to reach the Library within one minute. There are no water sprinklers; fire extinguishers are placed in strategic, easily visible positions on each floor. Emergency stairs and exits are located on each side of the building.

External Features

Externally both units are finished in Norman sized brick with concrete block backup. Window frames throughout are aluminium, with insulating glass in window openings to regulate heat gain and loss. Floors are made up of reinforced two-way concrete slabs, with reinforced concrete columns spaced to meet the modular system.

Assessment

The careful planning of this Library may be seen in the many small details which make for perfection. Clocks are located throughout the building so that the reader does not have to move far from his work station in order to be aware of the time. Coat racks are provided in all study areas and lounges. An intercommunication system, used for public announcements and in cases of emergency, has proved very satisfactory. A generous provision of signs throughout the building makes for ease of use and orientation. Public telephones, both Campus and off Campus, are located near the main staircase. There is generous provision of water fountains. Reading areas are designed to give the user a feeling of

comfort and they cater to almost every individual preference. A final touch which adds greatly to the atmosphere of the Library is the display of many original art works. Iowa State, by law, demands that 0,5 % of the building cost of any public building must be spent on art, and in the University of Northern Iowa Library a large, semicircular metal sculpture is suspended between the ceiling of the third level and the floor of the main level. Called "Dichotomy", it may not be everyone's taste in art, but it certainly is most impressive. In addition, the University Gallery is unable to display all its holdings, and is happy that the Library exhibit paintings, ceramics and sculpture on a semi permanent basis. It is expected that students and staff alike will benefit from exposure to these works (5).

In summary, the two most striking architectural achievements of this Library are function and ambience. The arrangement of books, readers and services on each floor is simple and very satisfactory, and major traffic routes are correspondingly logical. The entire building is aesthetically pleasing, comfortable and inviting to users. A large open access university library demands an orderly arrangement of materials and services if the patron is to operate independently, but this may easily result in a building which is rigid and impersonal. The architects and design consultants of the University of Northern Iowa Library have been unusually innovative in employing materials and design elements which introduce warmth, informality and beauty. The choice of colour and finishes throughout adds up to a pleasing coordination of features, and contributes greatly to a positive library experience.

Fig. 12.5 - View of Exterior and Entrance

Fig. 12.6 - Current Periodicals Area

Fig. 12.7 - Mailing Room

Fig. 12.8 - Study Lounge

References

1. THORSON, BROM. BROSHAR, SNYDER. Architects. *University of Northern Iowa Library*. Waterloo, Iowa: (n.d.). p.15.

2. UNIVERSITY OF NORTHERN IOWA. *Program of Requirements for an Expanded Library Building at the University of Northern Iowa, Cedar Falls, Iowa*. Revised final draft, by D.O. Rod Cedar Falls: University Library, 1971. p.7. (Unpublished).

3. Ibid. p.21.

4. FAULKNER BROWN, H. The open plan and flexibility. *International Association of Technological University Libraries*. Proceedings. vol.11, 1979. p.8.

5. Personal communication from D O Rod, Librarian, University of Northern Iowa Library, October 1984.

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1. THORSON, BROM. BROSHAR, SNYDER. Architects. *University of Northern Iowa Library*. Waterloo, Iowa: (n.d.). p.15.

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CHAPTER 13. UNIVERSITY OF DENVER LIBRARY

Architects:	Hellmuth, Obata and Kassabaum (St. Louis, Mississippi)
In charge:	Gyo Obata
Interior:	Hellmuth Obata and Kassabaum (St. Louis, Mississippi)
Gross size:	13 950 m²
Net size:	11 811 m²
Balance area:	2 139 m² (18% of usable space)
Book capacity:	2 million items
Seating:	1 400
Total cost.	$4,5 million (fully equipped)
Cost/m²:	$323 (equipped)
Date of completion:	August 1972
Librarian:	M. Schertz

Site

The University of Denver is situated on the outskirts of the city of Denver, Colorado. Ancient trees, landscaped gardens and elegant buildings, old and new, combine to create a scholarly and harmonious environment. The Library, named the Penrose Library after benefactors of the University, is located at the geographic centre of the Campus. From the front steps one sees three generations of libraries in the history of this 108 year old University in the Carnegie (now the Bookstore), the Mary Reed, one of the most handsome buildings on Campus and now a classroom and faculty office building; and the Penrose, which integrates into the main library previously scattered branch collections. The site provides space for expansion. It is bounded on the west by the

Students' Union and on the south by the Humanities Gardens, which give it a particularly fine approach and contribute to its being the focal point of University life.

Brief

The well developed and clearly expressed philosophical goals provided by the staff of the libraries enabled architect Obata to create what has become a model of innovative library design and construction. Their mandate (1) stated that one of the chief purposes of a liberal education is to make the student feel at home in the realm of learning ... to achieve an harmonious integration of his cultural growth with other aspects of his collegiate experience. A library was required which would work towards these ends by being such an inviting place that students would gravitate towards it on many occasions, not merely when they felt compelled to study. Requirements of the building were

- that it should have distinction and beauty symbolizing its importance as the centre of the University's educational and research activities;
- that it should be economical and efficient in its layout and design, without wasted space and unnecessary monumentality;
- that it should be carefully adapted to the needs of those using it;
- that it avoid ostentation, deriving its excellence from the appropriateness with which it relates to its functions and to its environment;
- that it create an atmosphere which invites student and faculty use.

The planners also noted that modern libraries are no longer merely storehouses for books and periodicals, but materials centres in which all kinds of recorded knowledge is collected and utilized in many different formats. They concluded (2):

> "It is impossible to say what the library of 1995 will be like. Technology has already begun to shake the foundation of university libraries. Whether all these changes will come to fruition is difficult to say. All that we can possibly do today is make certain that the building can absorb change and absorb it in a way which will not demand expensive and costly renovation. The keynote is flexibility"

Size and Extendibility

The Penrose Library was initially projected to accommodate needs over a twenty to twenty-five year period. Ideally the total building would have been planned and constructed at the same time. However, financial limitations were such that the building was planned in two phases. What exists today is Phase One; Phase Two is scheduled for completion in approximately 1995. Provision has been made for this future addition both in terms of site and construction. The planning team detailed the following requirements for the first and second phases of the building programme (3):

Phase One (Existing)

	Seats	Books	Staff	m^2
Public Services:	465	653 000	64	2 823
Stack area:	701	640 000	-	5 376
Technical Services:	-	-	75	837
Miscellaneous:	-	-	7	293
Total Phase One:	1 166	1 293 000	146	9 329

The total assignable area required for Phase One was 9 329 m². Assuming an additional area for non-assignable space, gross area required is 13 950 m². Phase One in fact has a slightly larger capacity than that stipulated by the planning team

Phase Two Additional Requirements (Future)

	Seats	Books	Staff	m²
Public Services	100	630 000	6	1 223
Stack area	1 142	640 000	-	6 491
Technical Services	No change			
Miscellaneous	No change			
Total Phase Two:	1 242	1 270 000	6	7 714
Total One & Two	2 408	2 563 000	153	17 043

The total assignable area required for Phases One and Two amounts to 17 043 m² Allowing for non-assignable space, the gross area of the final building will be approximately 25 565 m². At this stage the building will provide seating for approximately 27% of the projected enrolment

Flexibility

The brief stipulated that space within the Library must be flexible (4). In line with this requirement, modular design has been utilized with a bay size of 8,4 m through most of the Library With stack ranges placed on 1,22 m centres, seven ranges are possible within each bay Most of the shelving is standard 200 mm thus allowing stack aisles of 810 mm Widely spaced columns at regular intervals and the absence of supporting walls help to create flexible space The fixed elements of toilets, stairs, mechanical rooms and lifts are located around the perimeter in eight cores. In addition, the Library has a live floor load capacity of 7

kN/m² throughout, and ventilation outlets are liberally provided so that areas partitioned off are not without air supply. Thus the Library is easily able to adapt to changing requirements.

The University of Denver Library has been built on three levels, with the main floor in the centre (see Fig. 13.1). The proper organization of this floor is the key to an efficient library operation. Because this is the most heavily used part of the Library and the point of departure for most library patrons, it should be inviting and attractive. It is in both the organization and appearance of this main level that the Penrose Library excells. The functions assigned to this floor and their special interrelationships are critical and complex and have been dealt with by the architect in an uncluttered and logical manner, enabling the user to orientate himself quickly as he enters the building.

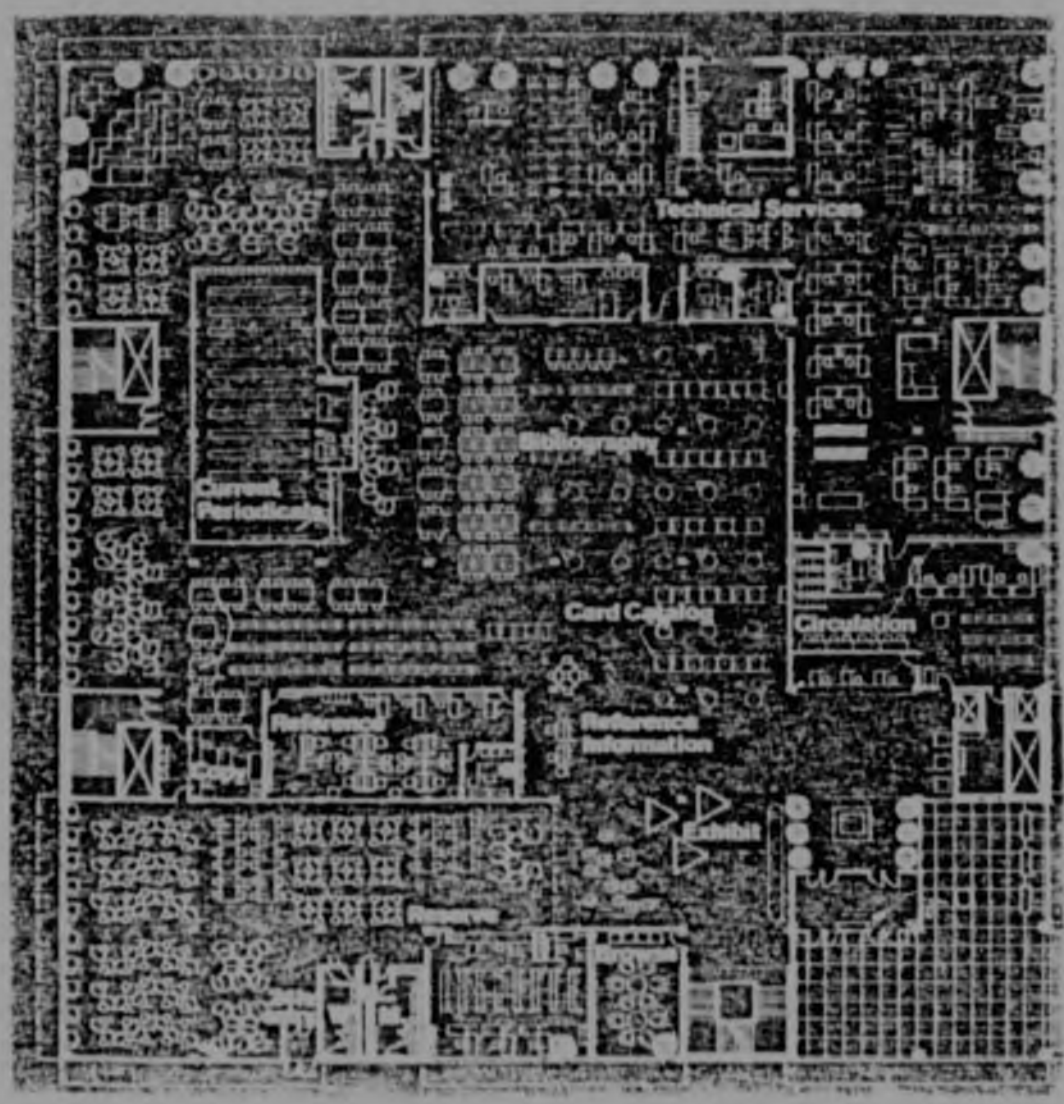
The lobby is an attractive, spacious area with the Circulation Desk - well sign-posted - immediately opposite the entrance, and the Information Desk to the left. Staircases to the upper and lower levels are immediately apparent. An open catalogue area is located to the left of the Circulation Desk, containing cabinets interspersed with consultation tables holding visual display units. The lobby also contains bright, informal modular furniture (see Fig. 13.4), in close proximity to an exhibition area composed of moveable wooden stands which are able to hold pictures, books and other types of material. They are versatile and economical in their use of space. Special lighting has been installed in order to enhance this display area. Immediately beyond this is a Browsing Room, providing a quiet environment for readers, and containing some current journals and new books. It is sufficiently removed from the Circulation Desk that the traffic will not disturb the reader, yet it is close enough for visual control by the desk staff. Although casual furniture has been provided in the Browsing

Room, it is not arranged in groups, as conversation is discouraged.

The Circulation Depa tment in the Penrose Library is provided with the space and facilities which this focal point deserves yet so seldom receives. It is here that the patron usually makes his first contact with the Library and a major function is thus a public service one. Various clerical activities include maintaining an even distribution of materials to and from the patron, through the circulation processes, and back to the stack area. The Department is divided into a public services counter, circulation records area, re-shelving area and circulation office. The counter is separated from the other three areas by a partition in order to limit noise and hide backroom operation from the public view. A stairway is located close to the counter so that the reader coming from other floors will not have to walk far to charge out books. The work area behind adjoins the Technical Processing area to facilitate the handling of new books requiring shelving. The re-shelving area is particularly successful. Here books are sorted in preparation for shelving, and thirty two single sided shelving units are provided with a capacity of up to 4 000 volumes. There is space for twenty-five book trolleys. The area also contains two book return chutes and depressible book bins. The book return slots are situated in the wall close to the public counter, and lead directly to the re-shelving area. This avoids books being returned and charged out at the same point, which can cause unnecessary traffic congestion.

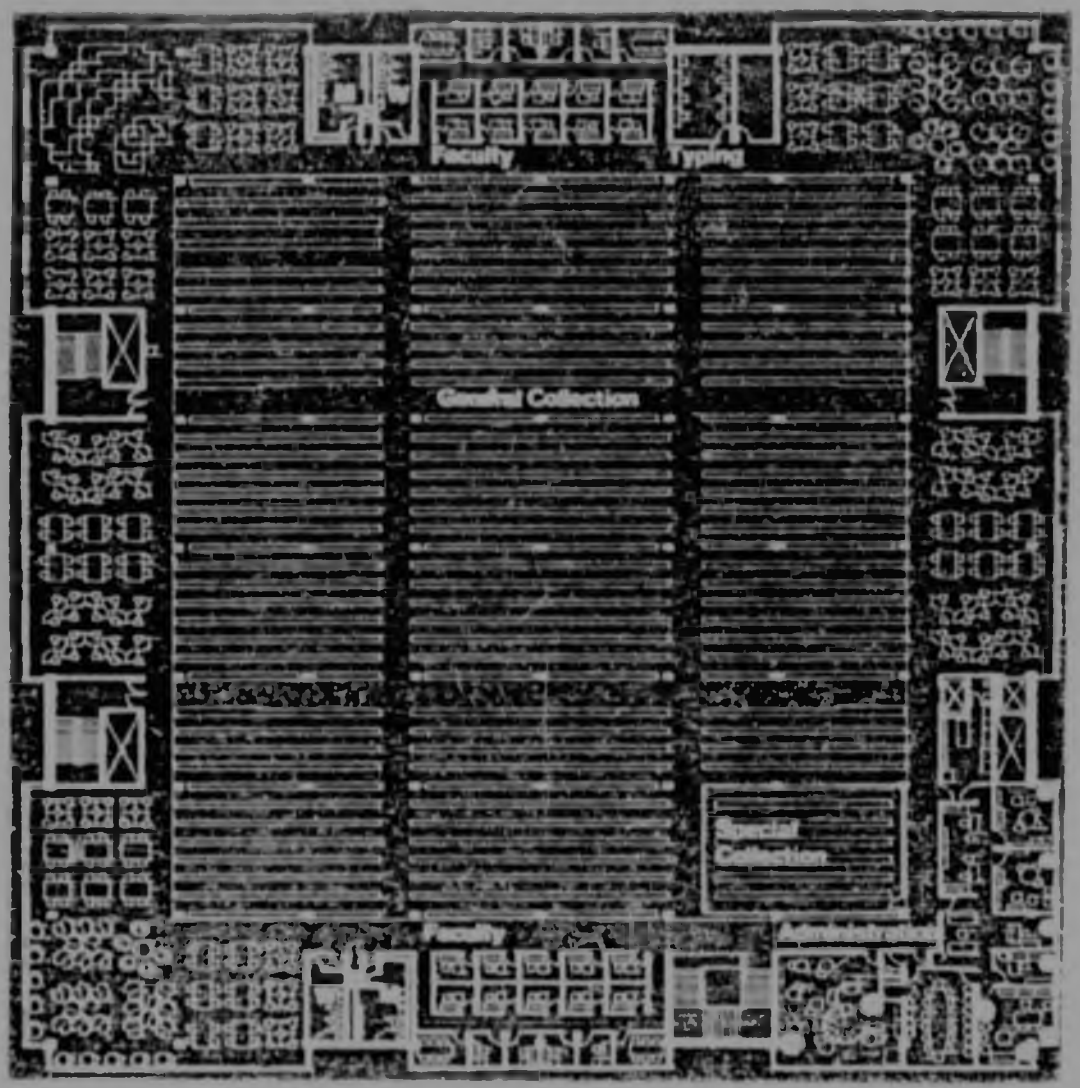
Between the catalogue area and Technical Processing Department, and in close proximity to the Reference Information Desk, is the Bibliography area, with storage space for approximately 5 000 volumes.

Fig. 13.1 - University of Denver Library: Floor Plan, Main Level



(Source: Penrose Library, *Interior Design*, April 1973, p.125.)

Fig. 13.2 - University of Denver Library: Floor Plan, Upper Level



(Source: Penrose Library. *Interior Design*, April 1973, p 129.)

The Current Periodicals Department lies between Reference and the serials section of Technical Processing, and is in close proximity to the Bibliography area. It is well related spatially to the bound periodicals collection on the floor below via a nearby staircase and lift. There is sufficient accommodation for 10 000 current periodicals, fifty current newspapers, and fifty readers.

The Reserve Collection is also on the main floor. It contains a reading room which has its own entrance, and may remain open after hours by means of a sliding screen which separates it from the Reserve Book collection and the rest of the Library.

The Technical Processing Department is ideally located on this main level. The individual departments making up this section (Acquisitions, Monograph Cataloguing and Serials Cataloguing) are closely related and linked by the line sequence in which orders for items and the items themselves are handled. Movement from one area to another is unobstructed. Serials Cataloguing is close to Current Periodicals, Acquisitions and Bindery Preparation are close to the Receiving and Shipping Room, and the processing area is adjacent to Circulation. The interrelationships of this area with others in the Library have obviously been carefully considered by the architect, and its location on this busy service level is as close to ideal as one is likely to find.

The lower level consists mainly of stack and study areas. Here are housed the bound periodical, microform, document and curriculum collections, as well as part of the book collection. Study stations are located around the perimeter in a variety of forms - student and faculty work areas, student conference rooms, individual carrels, typing rooms, smoking areas, and casual seating. An interesting and very practical design feature is that readers may approach the bookstacks directly from the access to the floor (all stairs and lifts) without moving through study or reading

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areas. The arrangement of stack ranges and aisles is simple and uniform. Major traffic lanes are wide and clearly defined being logically related to the core areas.

A staffroom and kitchenette are also located on this level, in proximity to a lift and toilets. A variety of furniture is provided, and equipment includes a refrigerator, stove, sink and vending machine. Good use of colour has been made in this room, and it is bright and cheerful.

The third level, like the lower level, contains primarily stack and study areas (see Fig 13.2). Also on this level are the Administrative suite and Special Collections Department. The former is an attractive area consisting of offices for the Director and two Assistant Directors, a general office and reception area, a conference room for up to twenty-five people, and a work supply room for stationery and photocopying machines. It is located within easy stair or lift access from the lobby for the convenience of visitors.

The Special Collections Archives area includes both storage space for the material housed here, and a small reading room for up to ten persons.

Internal Environment

The *Brief* to the architect requested that special care be given to the fenestration in order that the interior be protected from heat gain (5). Obata's solution to this is particularly interesting. Reflective double insulated glass has been used which permits one to look out on the Campus during the day. At night those outside may see into the Library while the users see only the reflected interior. By reflecting the sun's heat, the mirrored windows assist in providing an even climate throughout the year. Window frames are of aluminium.

The lighting system has been designed so that changes can be made as required in the location of fixtures without major expense. High quality lighting was requested by the planners, with an absence of glare and low contrast ratio. An intensity of seventy five foot candles is maintained at table height through most of the Library by means of fluorescent fixtures. These are at right angles to the stack ranges and placed 1,83 m on centres. In certain areas special requirements have been fulfilled. There is high intensity lighting at points on the exterior for night use, independent control of ambient lighting in the microform area, and spot lighting in the exhibition area. Electrical lighting circuits on each floor are controlled from a central panel located in the Circulation Department. Wiring is contained in conduits placed in a grid 1,83 m on centres. Provision is made for both 110 and 220 volt lines: television, visual display units and other computer equipment.

Air conditioning and ventilation are adequate. Temperatures are held at 22° Celsius and humidity at 40% as far as possible, and drafts of air do not appear to be a problem. Air circulation makes allowance for smoking in certain designated reading areas.

A public address system has been installed, with a sufficient number of speakers to enable sound to be heard everywhere in the building. It is used to announce closing time, fire drills, and for occasional special announcements in emergencies. It is located at the Circulation Desk with broadcast equipment locked away when not in use.

A variety of imaginative and comfortable seating forms are utilized, from bean bag seats to what Obata calls "megaform" structures. These latter are tiers of different levels, carpet covered, with seat backs formed by the next higher level, on which students may sprawl out, curl up or lounge as they wish. Another inno-

vation is the Penrose carola, a unique study carrel custom made for the Library. It is a hollow 1,5 m high moulded plastic cylinder with a third of the cylinder cut away for the door. A moulded plastic desk and seat, upholstered with foam and brightly coloured fabric, complete the unit. The majority of student seating consists of individual carolas and carrels. The latter are three sided, with a work surface of approximately 610 mm. x 915 mm. and a shelf above. Each is provided with a coat hook. There are twenty-eight faculty studies each 5,6 m². They are located conveniently close to the stack areas and each contains a study desk with drawer, side extension for typewriter, chair, shelves, chalkboard and electrical outlet. They are acoustically controlled and special attention has been given to ventilation to cater for smoking.

Located on the upper and lower levels are typewriting rooms - sixteen stations in all - and student conference rooms. The latter are grouped in pairs with a removable centre partition to provide a larger space when necessary. Each accommodates up to six students and contains a table, chairs, chalkboard and coat hooks.

Good use has been made of primary colours in this Library and the overall effect is cheerful and inviting. Yellow, orange and red carpeting provide a striking colour key for reading areas on each floor. Carpeting in the large bookstacks is off white, which helps to lighten these awesome, somewhat densely packed areas. Walls in the reading rooms are painted in colours corresponding to the carpeting, with bright graphic designs which are easily visible and recognisable from the inner stack areas. The interior decorator has created particularly successful staff offices. Many of these are without windows and situated in the internal spaces of the Library. They have colourful walls and excellent use has been made of mirrors to create interesting graphics, extend the office visually, and give an impression of space and light. (see Fig. 13.5).

Signs have been carefully devised, and the result is very successful. Major service points are indicated in white letters up to 500 mm. high. These are highly visible, serve their purpose admirably, and contribute a rather elegant formality to the bright and informal decor of the main floor. Clear signs containing floor plans and book classification schedules are provided on each level.

Economy

In a similar manner to the University of Northern Iowa Library, the Penrose Library copes as well as possible with variation in outside temperature through having a cubic shape and deep compact design. Economical movement of readers, staff and books is enhanced through locating the main floor at ground level, with floors above and below.

External Features

The exterior of the building has a simple elegance. To achieve this, materials were limited to three - precast concrete of earth-brown colour, reflective glass, and aluminium door and window frames (see Fig. 13.3). Dominating the walkway leading to the main entrance is a major art work in metal by Perry, one of America's top sculptors. The pieces of steel form two gracefully joined and folded ovals, four metres in diameter, which have coloured attractively with age and exposure.

The building is unusual in that fast track (phased) construction was used. This is a concept involving a team approach, a merger of architect and builder. It provides for a stipulated time schedule in the design and construction phases of the building, and these two elements are carried out simultaneously. The control of time is important, enabling more accurate cost predictions for labour and materials, and making it possible to build for a specific

agreed-to price. This was important to the University of Denver, which had promised the donor of the gift of $4,5 million a fully furnished building of 13 950 m² (6). A building contractor was appointed in whom the Librarian, Schertz, had confidence, and he in turn sub contracted the design of the Library. This worked well, as architect Obata, in bidding for the contract, was forced to produce most of his design and commit considerable time to the project before the contract was signed (7). It is believed that this is the first such usage of this rapid form of construction for a library, providing the advantages of both speed and economy. Approximately one year after groundbreaking, the move into the Penrose Library was completed and it was opened to students and faculty - surely a record in the history of academic library construction. However, Schertz (8) warns:

> Although phased construction worked for us and we would use the technique again if there were a need for a new building, it is not a technique one should decide upon lightly. There is insufficient time to debate and consider alternatives. The building program must be very specific in order to avoid confusion. Further, there is no possibility of using a committee. Responsibility for decisions must rest with one individual.

Assessment

The only negative comment that may be made about this Library concerns the stack areas on the upper and lower floors. These are very large and the aisle width of 810 mm is narrow. The planners realised this, but were convinced that it would be adequate. Others are less convinced. The sheer size of the stacks is intimidating. Wider aisles might have made them less so, although of course some storage space would have been lost. The planners also required that islands of seating within the stacks

should be avoided so as not to break the logical continuity of the arrangement, yet one wonders whether some seating might have improved the general environment.

All other aspects of this Library are very positive. It has qualities of flexibility, organisation and comfort which make it exceptional in many ways, and this is demonstrated in the heavy use made of its facilities by staff and students alike. It is also bold, inviting and colourful, providing spaces of unusual quality which are a delight to the visitor. The choice of Obata, an architect of twenty-five years experience and twenty four award winning designs, has paid off handsomely, and the University of Denver has a Library of distinction and beauty that is certain to accept gracefully the changes and developments that will inevitably affect it in the future

Fig. 13.3 - View of Exterior

Fig. 13.4 - Lobby with Informal Seating

Fig. 13.5 - Staff Office

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CHAPTER 14. CENTRALIZED OR DECENTRALIZED LIBRARY PLANNING?

Most university librarians in South Africa have had to, and in some cases are still trying to resolve the question of how much centralization or decentralization will best suit their particular library and university. South Africa is not an isolated case; the merits and disadvantages of both systems have been argued many times by overseas librarians who, in dealing with situations in many instances larger and more complex than our own, have arrived at widely differing conclusions (e g Bryant at Harvard and Smith at Boston).

Librarians are frequently caught between conflicting pressures. On the one hand university administrators desire to hold duplication of collections and dispersal of services to a minimum, while on the other faculty members press for decentralized departmental libraries. In planning new construction and considering changes in existing space utilization, librarians must decide whether it is more efficient to centralize or to decentralize operations. Combining libraries into a central facility may cost less, yet there is a cost in time, energy and decreased use resulting from location at too great a distance from users (1). It becomes obvious when reading the literature on this subject that each university librarian must take cognisance of local conditions before implementing or changing policy. Metcalf (2) states:

> "As long as there are universities with large libraries, the question of centralization or decentralization will be a live topic for discussion, and. the question will never be settled permanently one way or the other"

Decentralization may take place on two bases:

- kinds or forms of materials such as rare books, maps and audiovisual material;

- user- and subject-oriented materials, such as laboratory collections, subject divisional libraries, and professional school libraries.

The first kind of decentralization is not as contentious an issue as the second. Materials contained in rare book or audiovisual collections are frequently housed separately but within a central library, and they are unlikely to arouse the strength of feeling in faculty staff that a subject collection will. It is user- and subject-oriented decentralization that becomes a major planning criterion in most established university libraries.

Wells (4) recognises five main types of decentralized collection:

- branch

- subject

- departmental

- class or seminar

- institute

These develop for various reasons in universities throughout the world. The question of their continued existence arises periodically when changing circumstances on university campuses call for a reassessment of library services. Tauber (5) suggests that

the following conditions give rise to a re-examination of the subject:

- constantly rising costs of academic library operation;
- development of new libraries;
- absorption of academic units and their libraries in expanding university departments;
- development of entirely new campuses.

Two further conditions could be

- the accelerated growth of library collections leading to critical space problems;
- the type of library service planned for the future and the proposed use of technology.

A university librarian faced with changing circumstances of this nature must give consideration to the various arguments for and against centralization, remembering that they are purely theoretical until measured against a particular set of circumstances. The basic criterion should always be library service. How can the library provide the best service in the most economical and effective way? For the purposes of this study both viewpoints will be discussed, as both are valid and deserve the attention of the library planner.

Arguments for centralization

1 **Cost.** In a centralized library funds are not wasted through excessive duplication of materials and a profusion of service

points that must be staffed for increasingly long hours of opening. To illustrate the latter, Wagman (6) has stated: 'Fully 30% of the personnel budget of my library system is spent in staffing the many branches in less than adequate fashion' It is generally assumed, although not proved, that a centralized system is also more economic in terms of space and equipment.

Staff. As small a unit as the departmental library is too often staffed by a non professional assistant who is not qualified by either training or experience to interpret the collection to the library's public. In addition to this problem of staff quality staff quantity also causes difficulties. The one-person library is commonplace If that person is a professional, he or she cannot be employed economically because a large portion of time must be spent in clerical routines Professional or not, a single library employee is undesirable from an administrative standpoint because of the difficulty of providing relief staff in the event of absence Furthermore, the library suffers from discontinuity of policy and practice which is inevitable when personnel changes as it frequently does under these circumstances 7).

3 **Efficiency** A library permits supervision of all library activities by trained personnel and assistance and service may be standardised and maintained at a high level Rather than moving from one library to another, the user will find all the material he requires in one place consequently less time is wasted by staff and students and in transferring books from library to library Efficiency may be further improved by generous provision for loans and a prompt messenger service.

4 **Accessibility**. A central library makes available and equally accessible to all departments the various book collections of

the institution No department should have the right to exclusive possession of any book if it is potentially useful to readers in other departments

5 **Interdisciplinary Approach** There is a growing interdependence of knowledge and this is reflected in research and education This approach may be encouraged and facilitated in a central library, while fractionalisation of the collection into branch libraries has the opposite effect Bruno (8) points out "With the concept of the unity of knowledge, especially in the sciences departmental libraries are giving way to a larger subject division approach"

6 **Communication.** Communication on the university campus is hindered by a branch library system A central library on the other hand provides a meeting place for faculty and staff of all departments, making for a feeling of fellowship in scholarly pursuits and encouraging cross fertilization of ideas

7 **Convenience.** Although the idea of bringing library materials on a particular subject closer to the students studying that subject is attractive, there is in reality no one place where all material on a subject may be found A certain journal may be of use to students in a variety of disciplines, and a single assignment could take the enterprising student all over the campus in his search for material Watts (9) states "Sound scholarly research is hard, detailed and exhausting work But let's not make it any harder by carving up knowledge and separating it unnecessarily by placing it all over campus"

8 **Attitudes and Educational Significance.** Staff and students using a departmental library tend to regard it as theirs and do not see it as a subject section of the larger university collection As a consequence they may either remain ignorant

the institution. No department should have the right to exclusive possession of any book if it is potentially useful to readers in other departments.

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8 **Attitudes and Educational Significance**. Staff and students using a departmental library tend to regard it as theirs, and do not see it as a subject section of the larger university collection. As a consequence they may either remain ignorant

or fail to exploit the resources of the library system as a whole (10). As regards library staff attitudes, branch libraries can create unhealthy loyalties to the welfare of a given branch and the department or faculty with which it is associated rather than to the library and its collection as a whole.

9. **Technology**. Improved and more sophisticated machine-based services may be offered in a central library. Because of the cost of equipment and expertise on the part of personnel (e.g. online information service), it is frequently impossible to extend these to branches.

10 **Administrative Control**. Coordination, cooperation and communication are difficult to achieve in a widely dispersed library system.

11 **Adequacy**. It is inevitable that departmental book funds will be inadequate to supply all that is wanted in a departmental library if the public it serves expects the library to be self sufficient no matter how wisely money is managed (11).

12 **Response to Change**. It is often impractical to pattern library structure on the administrative organisation of the university. The distribution of courses among departments sometimes changes, academic staff may move between departments taking their subject specialities with them departments may move from one building to another new departments are established and others may be discontinued Central libraries and their services are unaffected by these changes

Arguments for Decentralization

Is one central place on the campus where all library and information materials are housed necessarily the best configuration?

1. **Cost.** The costs of decentralization are more talked about than studied (12). The apparent lower cost of a centralized library service in terms of staff and equipment may be countered by the provision of separate subject areas in the care of subject librarians within the central building.

2. **Staff.** By virtue of the branch librarian's contact with the subject material, a more valuable and informed service becomes available. However, the provision of subject librarians in the central library may negate this argument.

3. **Efficiency.** A central library for a large institution cannot be other than a large building, with many sections and considerable distances between remote points. The size of the campus and distances to be traversed from faculty buildings to the central library are factors which should also be considered.

4. **Accessibility.** It is impossible for a busy academic to make the best use of materials in his field when they are housed in a building distant from his faculty. Materials relating to special subjects are most accessible when located near the places of departmental instruction and research (13).

5. **Interdisciplinary Approach.** Computerized catalogues allow the user to browse easily, and he may directly access databases much larger than that of his own university through the advent of local and national networking. Woodsworth (14) believes that "Providing access to the larger world of information is probably a more important issue in today's interdisciplinary and decentralized world than is the question of where a book is housed." Hibbard (15) concurs with this statement. "When all researchers have terminals in their offices through which they can access not only their own libraries but the holdings

of every major research library in the country the question of the physical location of holdings will loose its meaning for most purposes".

6. **Communication.** For many decades communication has been raised as a valid argument in favour of centralization. However, the tools are available today to dispel the isolation of remote collections alleviate inconvenience to users, and provide faster communication among disciplines of knowledge. Computerized catalogues are playing an important role in this respect

7. **Convenience.** It is not immediately obvious why a large, centralized collection spread over many square metres of floor space in a multi storied building is more convenient than a series of well thought out topical collections housed in branch libraries In either case a good deal of walking may be required of the researcher (16) There is no doubt that the patrons of libraries prefer the smaller more focused units of library service located close to their offices, laboratories and lecture theatres

8. **Attitudes and Educational Significance.** The identification of a student with his speciality is furthered by a branch library. Students, particularly those in professional faculties (e g law, engineering, medicine), may value the opportunities which exist for the creation of professional consciousness as a result of working together in a common location separate from the general student population.

9 **Technology.** Although certain services cannot be practically duplicated in a branch library system, technology has done much to increase the efficiency and dispel the isolation of the

subject collection. Online union catalogues and circulation systems may easily be made available at all service points.

10. **Administrative Control.** Although administrative control is better in a central library, there is far more academic interest in the affairs of the specialized library. As long as this situation is not permitted to develop into faculty control, it can have a positive effect on a library, its collection and its services.

11. **Adequacy.** To make a library collection complete and workable requires a measure of attention that cannot be given by a central administration that has too many interests to observe (17). Again this argument is countered by the provision of subject specialist librarians in a central library.

It may be seen from the above that the same criteria may be used to prove a point by both the centralist and the decentralist. The challenge for academic librarians is to provide an efficient and economical library service in the understanding that the increasingly interdisciplinary nature of knowledge means a more complex campus community. There is no simple answer to the question of how much and what kind of decentralization should be permitted.

The main disadvantage of a central library is lack of accessibility for students and staff, although attempts have been made to overcome this. Greene (18) describes a system called *LENDS* (Library Extends catalogue access and New Delivery Service) in operation at the Georgia Institute of Technology, where there is a wholly centralised library service. Remote bibliographical access is provided through the distribution of microfiche copies of the catalogue to thirty-five academic and research departments. Library material may be requested by telephone, and items are delivered on morning and afternoon schedules to all departments by

means of a battery-operated cart owned by the Library. Items borrowed from the Library may be returned via the same delivery service.

The main disadvantage of decentralization is expensive duplication of stock and staff. There is no way of countering this problem unless the institution has a budget which will afford good service for both general and separate libraries. In today's financial climate, a multiplication of departmental collections too small to be staffed or serviced economically or which require extensive duplication, is unnecessary and undesirable.

Some years ago the undergraduate library was thought to be an attractive and acceptable compromise between centralization and decentralization. The philosophy behind this was that the undergraduate deserves a facility geared to his needs, as he is frequently overlooked in the research and publication interests of the university. There is no doubt that separate undergraduate libraries help to solve the space problem occurring in main libraries, but their educational efficacy is questionable.

Shoham (19) has undertaken a cost preference study of the decentralization of academic library services, using the Library School at the University of California, Berkeley, as a test case. The methodology used was to analyse various categories of cost, using data obtained from library staff; to allocate a dollar value to the user's time according to his status and salary; and to obtain attitudes of users by means of a questionnaire. An analysis of all this data provided interesting results:

- It was clearly shown that there is some duplication, especially in labour, to the extent of about 43% of the labour cost.

- Duplication of material was surprisingly low (7%), this being the result of a careful acquisition policy adhered to in this particular library system

- Additional costs in space equipment and maintenance were also incurred.

- The users preferred accessibility to greater completeness of the collection, and even very modest assumptions about the value of users time suggested that the additional costs of decentralization can be justified in terms of overall costs

No matter how efficient a centralized library may be on the basis of costs, it cannot be effective unless it is used by those for whom it exists Shoham s study supports this viewpoint

There may be an optimum size of library beyond which the service becomes too complex, impersonal and mechanized The optimum is perhaps a unit large enough to be efficient but small enough to retain some of the informality accessibility and special services of the good branch library The desired result is a compromise between an overgrown main library and an over fragmented system of subject libraries Aucamp (20) puts the manageable size of a library at up to 500 000 volumes and suggests that at this point a certain measure of planned decentralization might be considered. This planned decentralization is in many cases more realistic than centralization It implies the establishment of large area libraries serving the subject fields in that area Blackburn (21), Librarian at the University of Toronto, believes

> "If we could start from scratch to build a complex university of 25 000 students, I should try first of all to get the teaching divisions clustered in three or four groups, each

group centred on a large subject division of the centrally administered library system

Hertz (22) agrees with Blackburn, stating that library service should be on a broad subject basis reflecting the major divisions of knowledge, the principal methods of instruction, and the needs of the students and faculty. If departments are grouped in this way and receive service from a separate library, the centralist arguments on cost and interrelation are largely overcome. Unfortunately, most universities cannot start anew and are not prepared or able to undertake massive relocations of academic faculties.

Muller (23) lists certain elements of an ideal pattern:

- As much centralization as is logically feasible plus decentralized units in the largest possible segments. Controlled decentralization.

- Consolidation of science branch libraries into a single library to be kept open as long as possible. Personalised service, computer links to relevant databases.

- Current awareness service to academic staff.

- Opposition to separate branch libraries except medicine and law.

- Compact storage for lesser used material.

- Easy access to regional and national collections through networking.

- Campus-wide rapid delivery of library material to academic departments, combined with quick access to central records Similarly between libraries.

- Campus planning to aim for subject groupings of instructional buildings, so that area libraries may serve broad subjects Applicable to new and developing campuses.

In conclusion, it seems that when decentralization of a university library collection is thought to be necessary, the librarian should if possible establish large branches housing collections covering subject areas as broad as possible and serving a cluster of academic departments Library systems with existing departmental libraries are well advised to merge small units into large units, even in the face of faculty opposition Experience with a library unit large enough to support adequate staff, services and collections will, one hopes convince a reluctant faculty of the wisdom of consolidation.

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CHAPTER 15. THE LINEAR LIBRARY

The concept of a linear library is one which has not been given much serious consideration in this country - with one important exception - nor indeed in many other countries. Yet it cannot be ignored if one is to examine fully the subject of centralization decentralization. The basic concept is that while the library s administration and main services are centralized, a library continuum reaches out to place the bookstock as close as possible to the teaching departments (1).

The principle has been used at the University of Bielefeld (Federal Republic of Germany). The Library had its beginnings in a number of divisional collections, but in 1976 it moved into the newly constructed main building of the University (2). The Library stretches along the length of this building, housing library materials in subject collections close to the relevant faculties. This linear libr , was the result of a serious attempt to avoid divisional libraries, create an integrated library system, yet provide accessibility to the user

The University of Bochum in Germany is reported in a publication of the University of Cape Town Libraries (3) as having a linear system, but this is in fact not so The present Director of Bochum University Library, Adams (4), reports that it is a classical German university library, with a central library and several independent institute libraries Confusion possibly arose from the fact that Adams was Deputy Director at Bielefeld during the planning stages of that university s library.

The University of Cape Town has adopted this concept as a means of coping with severe space problems in the main library compounded by the necessary constraints on the vertical growth of buildings in order to retain the harmonious balance of the Campus. The idea of creating a linear library was born out of necessity, but today, having been through various stages of development, it provides academic staff and students of the University with an efficient and accessible service.

The Librarian and the Planning Board of the New University of Ulster (Northern Ireland) decided on a linear library in the early stages of planning the new Campus. The library spine principle was seen as the solution to two apparently conflicting functions:

- On the one hand the Library was to provide a central service under one control;

- On the other it had to be possible for specialized books related to particular areas of study to be situated physically close to them.

Although the Librarian, Hurst (5), admits that he would make a few changes were he to start again, the Library of the New University of Ulster forms a unifying feature of this young Campus and is in fact the main spine of the University, linking the various teaching departments or schools through the school libraries.

The University of Odense in Denmark, completed in 1977, has a linear library. It occupies the first (top) floor of a narrow spine and small parts of the ground floor below it where the main entrance and circulation desk are located. Covering a length of about 200 m., it has two subsidiary access points to faculty buildings. Neither the Library nor the academic staff approve of the system, and despite its supposed accessibility, a few departmental libraries

have sprung up and now exist side by side with the linear library (6).

The planning team for the University of Jos in Nigeria included as consultants the architects responsible for the University of Odense. It considered the feasibility of a linear library in 1978, but eventually decided in favour of a central library. The group concluded that although the linear library should offer advantages compared to a system based on departmental libraries, it was not as effective as a central library (7)

No further mention of linear libraries (University of Cape Town), spine libraries (New University of Ulster), or the library continuum (Bielefeld University) has been found in the literature. Although theoretically the linear library should provide maximum service to readers at reduced cost and a logical answer to the problem of decentralization while preserving control in practice the concept is not favoured Apart from the few examples mentioned no universities appear to have considered it as a suitable solution to the problems of accessibility decentralization or shortage of space The three main examples of linear library development will be considered in more detail below

University of Cape Town Library

In the early Seventies, the University of Cape Town Library had outgrown all available space in its existing main library. A restriction on the height of buildings on the Groote Schuur Campus prevented the Library from expanding vertically and it was considered undesirable to build a new library on an alternative site, as the Jagger Library already occupied an ideal site at the heart of the Campus Measures were taken to ensure that optimal use was made of existing buildings; a series of mezzanine galleries was added to Jagger Library, as were annexes and a building

occupying semi-underground space between the Library and a neighbouring building. At this stage the University Planning Unit, in paying particular attention to the Library's problems, proposed the idea of 'linear' library development as conceived in the planning of Bielefeld University and the New University of Ulster (8).

It so happened that at this time (1974) an extension to the Engineering complex of buildings to the south of Jagger Library was being planned. This enabled the Library to establish its first linear development, and library space was created on the third level of the Menzies Building, linking to the fourth level of Jagger (see Fig. 15.1). Linear development to the south was completed in 1979 when the Library was given space on three levels of the Leslie Building (9). The public area on the third level is linked by a passage to the Menzies Building. In 1981-82 the Immelman Building was constructed behind and to the north of the Jagger Library. It forms the first northern development in the linear plan, and provision has been made for further growth in this direction by including a wide passageway in the extension to the Students Union Building. It is possible that a Life Sciences Library may one day be built on a site north of the Union, linked to the Immelman Building by the passageway as indicated in Fig 15.1.

The principles of the linear library concept at the University of Cape Town have been outlined by the present Librarian, Hooper (10) as follows:

- That technical processing activities and unique services should be centralized;

Fig. 15.1 - University of Cape Town Linear Library Syste

(Source: UNIVERSITY OF CAPE TOWN LIBRARIES. *The Linear Library Moves Towards Completion*. Cape Town: The University Libraries, 1983. p 1.)

- That books and periodicals (i.e. readers' services) should be decentralized, and as far as possible placed close to the departments which are the main users. In cases of competing user groups, the principle of the greatest benefit to the greatest number should be observed;

- The linked buildings of the linear library should be easily readable so that users may find their way to any desired destination or book with ease;

- Within the Library the main classes of the classification system should be set out in a logical and thus easily understood continuum;

- The various components of the linear system, both reader service departments and purchasing activities, must be linked by good communications e.g. telephones, intercommunication systems, lifts, stairways, straight passages. There must be a good sign system, and printed guides should be available;

- The spaces created in the rebuilt portions of the linear library should be entirely flexible in the sense that they may be used for any normal library activity e.g. reading, stack, office, seminar or workroom.

In line with these principles, an attempt has been made to locate the bookstock in areas of the linear system where it will be most accessible to users, at the same time trying to preserve some kind of logical order and sequence. This has not always been easy. The books, classified according to the Dewey Decimal System, start at 000 in the southernmost portion of the Leslie and run via Menzies to the 900's in Jagger, with certain modifications. Although the Dewey system separates the languages (400) from the literatures (800), it would be very inconvenient to users were

these two sections to be separated geographically. A decision was thus taken to withdraw these from the general sequence and to house them together on the fourth level of Jagger Library, where they are in close proximity to the Arts Block and hence the majority of users.

The Library's main catalogues and reference collection are located on the fifth floor of Jagger, where the southern continuum of the linear library enters. Also on this level are the Inter-library Loans Department and the main issue desk, at which library users may return books from any of the linear library's constituent parts, except Short Loan and Special Collections (11).

The Short Loan Collection is housed in the front of the original Jagger Building. It is designed so that it may be closed off from the rest of the linear library at the end of the day, providing a quiet study space for students late into the night. This part of Jagger is very central to the upper Campus, and thus is very convenient to the undergraduate students making use of the short loan facility (12).

The two upper levels of Jagger contain library administrative offices and technical processing departments. The two lowest levels, with the exception of the Short Loan Collection, are for storage, staffroom, delivery, microfilming, photographic and photocopying activities. The fourth level of Jagger links with the Immelman Building, where the Science and Engineering Library is housed (see Fig. 15.1). This building is ideally sited geographically, lying between the two faculties on a major pedestrian thoroughfare.

The lower two floors of the Leslie extension contain the Africana and Special Collections Division, an interdisciplinary collection which would interfere with the logical flow of books if placed

within the linear library continuum Compact shelving is provided for these collections

Although a number of modifications have caused departures from the original linear principle, the Library at the University of Cape Town has been flexible enough to allow for these local changes Adaptation to a particularly restrictive situation over the past ten years has been positive Although the linear plan is not ideal in that it has had to grow on an existing pattern of buildings and teaching departments it does take library services into academic areas Those in favour of the linear system feel that it has potential and in terms of future planning, will provide for the growth and development of the University Library s services in the future

New University of Ulster Library

Planning for the New University of Ulster began in 1966 It was initially expected that the University would grow from 400 students in 1968 to over 6 000 in 1980, but this has not been the case, and the slower rate of growth combined with financial restrictions imposed by the University Grants Committee have caused a number of modifications to the original plan. The Campus is located in Coleraine in Northern Ireland on a large open site, which is swept by strong winds in winter.

The teaching and research programmes of the University have been organised into five schools Humanities Education, Physical Sciences, Biological and Environmental Studies and Social Sciences (13) The Library is seen as an important part of this structure, and it was decided to phase its growth in accordance with that of the University Hurst (14) University Librarian, describes the four main factors which influenced him in the early planning of the Library:

- "Books, staff and buildings are quoted as being the three main elements in a library which when properly integrated produce a service. We started by envisaging the sort of service we wanted to provide, and then designed a building and staff structure to suit it;

- It was declared University policy to provide a centralized service for reprography, photography and other unique services

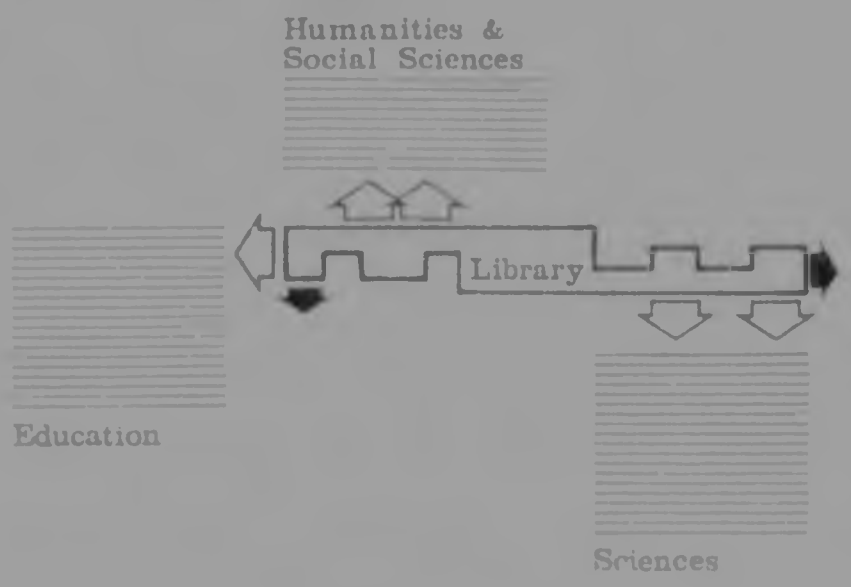
- The need for economy was [illegible] that there were to be no departmental libraries. This required the Library to adopt a policy of acceptability that would cut out any demand for them, and the idea of decentralization without fragmentation was born

- Investigation of [illegible] showed that there were many problems requiring solving. Issue systems and cataloguing procedures were two such instances. It therefore seemed essential to avoid making certain irretrievable decisions too early in case these prejudiced future developments".

There was not much time for detailed planning however as the first intake of students was scheduled within two years. The University proceeded with Phase One a permanent multi-purpose structure which would contain the complete range of accommodation necessary for the first few years (see Fig 15.3). The Library occupied an area of approximately 7 000 m² in this building. It was originally intended that this space be reallocated to the Education Centre when Phase Two was completed and the Library moved into new quarters (1973). This plan assumed that a conventional central library would be built. Hurst however resisted

the idea of a central library, and with the help of a sympathetic architect, proposed the 'spine' library (15).

Fig. 15.2 - Library Spine Principle



He believed that in the absence of departmental libraries, an acceptable service could not be accomplished by a separate central library, especially on the exposed site. Under his influence, it was decided to create a library which, from the start, would be decentralized without being broken up into separate buildings. This thinking was extended to a point where the four school libraries would exist in one building and form the physical links with the teaching blocks. The Education Centre Library would remain in Phase One. Each school library would have its own entrance and control point, and would contain the books necessary within that school. These libraries would be under the control of a central administration which would be responsible for all technical processing. It would be possible when within the control area to move freely between the school libraries, which, to solve the

problem of expansion, would have no permanently defined limits (16).

Implications of this were obvious The arrangement was practical only if:

- an issue system could be found that would function economically and efficiently with a number of service points
- a cataloguing system could be created that would allow sectional catalogues to be easily produced;
- staffing which did not need to be excessive could be afforded to staff most of the service points most of the time;
- librarians could be provided to liaise with the service needs of each school and liaise appropriately with the academic staff and students;
- the communications system were [illegible]

The concept of the Library as the main spine of the University, linking the schools through the school libraries, has been a determining factor in the planning of the University. In addition, climatic conditions required that a maximum degree of protection be provided by the close grouping of buildings Fig 15.3 indicates the relation of Phase One to Phase Two. The original library was initially intended to link physically with the rest of the Library system However due to a miscalculation concerning the structure of the subsoil to the north west this is not possible, and the library serving the Education Centre is in fact separated from the library spine

Fig. 15.3 — New University of Ulster: Phases One and Two

(Source: NEW UNIVERSITY OF ULSTER. *Report on the Development Plan*. Coleraine: The University, 1968. p.50.)

In the context of the University, the spine is a long building of four storeys sited along the valley floor at right angles to the main pedestrian concourse. It will ultimately be approximately 300 m. long. Except in its centre where it crosses the concourse, its lowest floor is largely open. The first and second floors contain parts of the schools whose buildings adjoin the spine, and certain central teaching facilities such as lecture and seminar rooms. The third and top floors contain the Library. The spine and concourse divide the University into four parts

- In the north, communal buildings and central teaching and research facilities;

- The southern part is primarily open space, enclosed by the Phase One building;

- The eastern part houses the Schools of Physical Sciences and Biological and Environmental Studies;

- The western part houses Humanities and Social Sciences

The major pedestrian route connecting the schools of study are on the same level as the concourse, but within the spine.

Although the idea of a spine library appears to be a logical one, Hurst (17) reports that it is not without its problems at the New University of Ulster:

1. It has not been possible to operate fully the access links with subject departments for financial reasons. A shortage of junior staff has frustrated attempts to provide the sort of service it was hoped would be possible. This situation might have been avoided had the University expanded at the rate originally projected.

2. It was originally intended that a conveyor system be installed. However, Hurst reports that the University Grants Committee was and still is unsympathetic to this need on the grounds of cost. This is unfortunate. As Hurst rightly points out, lifts and hoists are acceptable services in a vertical building; why not a conveyor belt in a horizontal one? The UGC has never forgiven us for not building a cube (18).

3. Although Hurst firmly believes that a long, horizontal building has distinct advantages over a tall, vertical one, it does involve sharing a building with other users, leading to many difficulties which were often amplified by the Library s being on the top floor. For example, at the design stage the location of the lift changed many times to suit requirements on lower floors.

4. Financial restrictions frustrated the intention to have lighting capable of being switched in small blocks, as this was too expensive to install. The result is greatly increased running costs.

5. Designing and building a library when it is part of another building and only one of several simultaneous operations results in pressure on the University's Planning Division. Frequently reconciliation is needed between the conflicting demands of different briefs, leading to results which are not ideal for either party.

6. The original plan of the library spine includes transepts which did not materialise, and hence the Library is short of adequate space for special collections

7. Hurst feels that his Library pays the penalty for being *too* accessible, especially when there is a shortage of nearby

amenity accommodation. As a result, it is used as a social centre as well as a place in which to study.

The positive aspects of the spine library are as follows:

1. Developments in computerized cataloguing have meant that microfiche copies of the catalogue are located at many places in the system for the convenience of users, thus resolving the initial problem of distance from a central card catalogue.

2. Installation of a computerized issue system throughout the spine library has greatly increased efficiency.

3. In Hurst's words "We have kept departmental libraries at bay" (19).

4. Librarians are responsible for the library affairs of a particular school and represent the Librarian on the appropriate School Board of Studies. This system works very successfully.

5. Because of climatic conditions, it was University policy that no-one be required to go outside to reach the Library. Thus it is highly accessible and correspondingly well used.

6. Each School Library has its own entrance and control point. Each unit may be closed if necessary, and certain parts of the Library may remain open while the rest is closed.

7. All technical processing is done centrally.

8. In the summer of 1984 the Library was allocated considerable extra storage space, fitted with compact shelving, at ground level immediately below the Library, and accessible by lift.

This has greatly improved conditions in the spine library and provided space for expansion

The main advantage of the spine library as it exists at the New University of Ulster is that it was considered in the early tages of University planning, and in fact has influenced to a very large degree the development of the University as a whole. Thus it is centrally located and very accessible. It is easier creating a spine library from the beginning than imposing one on an established university structure. It is also in all probability more successful. Although the results are not exactly as Hurst planned them some years ago, he reports that he has no regrets about what he tried to do. "I still think the concept of a linear library is a good one, although ten years' experience has produced some disadvantages which, were I starting again, I would make provision for" (20). These would include an adequate store at a much earlier stage, and, most importantly, the location of the library on the gound floor rather than the top floor. Also of major importance is the need for efficient communication systems.

Bielefeld University Library

The University of Bielefeld was established in 1969 as a result of public demand for a university in Westphalia, West Germany (21). It is unlike other universities in that with the exception of a few subordinate structures and a large parking garage, there is one enormous building, an integral unit with flexible interior design. A large, two-storey central hall is bordered by two parallel buildings of concrete and glass rising to eight and nine floors respectively, and the central axis serves as a connecting passage, permitting access to all divisions. The plan of this main building is a variation of the comb scheme, with individual blocks arranged on both sides of the central passage. From the exterior a broad stairway, essential due to the sloping site, leads from the

main entrance to the central hall. From here a peripheral gallery at mezzanine level provides access to the reading rooms of the Library, which occupies the entire first floor.

The Library has central administrative offices, inter-library loans section, general reference collection and technical processing area. These are housed on three floors of the building (1st Basement, Ground and 1st Level). The reading and bookstack areas are divided among five separate spaces that house three science and seven humanities collections. Offices of the various subject librarians are located in these spaces.

There is no real main entrance to the Library. Entry to any branch reading room north or south of the longitudinal axis of the hall provides access to all other reading rooms, which together form a spatial continuum (see Fig. 15.4). In three cases - Literature, Sociology and History, the floor below is also included in this continuum (22). The teaching departments with their administrative offices, seminar rooms, laboratories and lecture theatres are housed on floors above and below the reading rooms.

The Library as a whole provides seating for 2 675 readers, and houses a bookstock of approximately one million items (with a capacity of over two million). It covers an area of 139 387 m^2. The branch libraries include reading areas, open access bookstacks, special work areas, microfiche and online catalogues, reference collections and audiovisual materials, as well as the necessary personnel and administrative space (see Fig. 15.5).

Regarding communications, there are passenger and goods lifts from the entrance to the reading rooms in each block. In addition, reading rooms occupying two floors contain book lifts. As a result of financial restrictions during construction, no further transport facilities are provided (23). However, modern data processing

techniques have proved to be a vital and positive factor in promoting administrative cohesion and in integrating the library system. Circulation systems at all access points are automated, and ordering and cataloguing of material are done online. Thus information on the availability of material is at the disposal of the user at any point in the system.

The fundamental principles determining the structure of the Library have been outlined by Krieg (24):

- The information centres were to be linked to the Library's central administrative and technical services;
- They were to be administered by qualified staff responsible to the Librarian;
- Materials were to be on open access;
- The faculties themselves were to participate in the acquisition of material for each respective library.

Thus the system, described by the Bielefeld Foundation Committee as "... a radical solution to the concept of decentralization ..." allows each of the University Institutes sufficient scope to influence the development of its library in accordance with its specific research requirements (25).

It was felt to be necessary, however, to keep the number of branch libraries to a minimum by integrating the customary institute libraries into larger units; to regard the University Library as a single unit; to guard against book collections being built up erratically without sufficient consideration being given to future research needs; and to ensure that the authority of the Library staff was not reduced (26).

Heim (27), Director of the University of Bielefeld Library until October 1984, reports that the concept and structure of the Library has endured several crucial test situations over the past eight years In its early years only the circulation system was computerized The introduction of automated acquisition and cataloguing functions was delayed for a considerable time. This lack of system information in turn delayed user acceptance of the linear library principle The importance of online information at each enquiry circulation point in the system cannot be overemphasised If unavailable, the problem of fast communication over considerable distances is almost insurmountable.

In conclusion, it is possible that a linear library may operate adequately when:

- the university is planned in its entirety from the beginning, and the library is taken into account in these early stages;

- the branches are viable book collections in themselves;

- sufficient thought and finance is expended on excellent communication systems, both in terms of horizontal and vertical transportation and electronic links between all parts of the system.

Dangers are that

- if branches are to be accessible to user departments there will of necessity be large distances between remote points of the system,

- this could actually *impede* access;

- it will in all likelihood encourage the duplication of stock in overlapping areas;

- the main advantage of the system - accessibility, cannot be maintained after normal working hours without expensive employment of additional staff;

- security is reduced with an increase in entrance exit points,

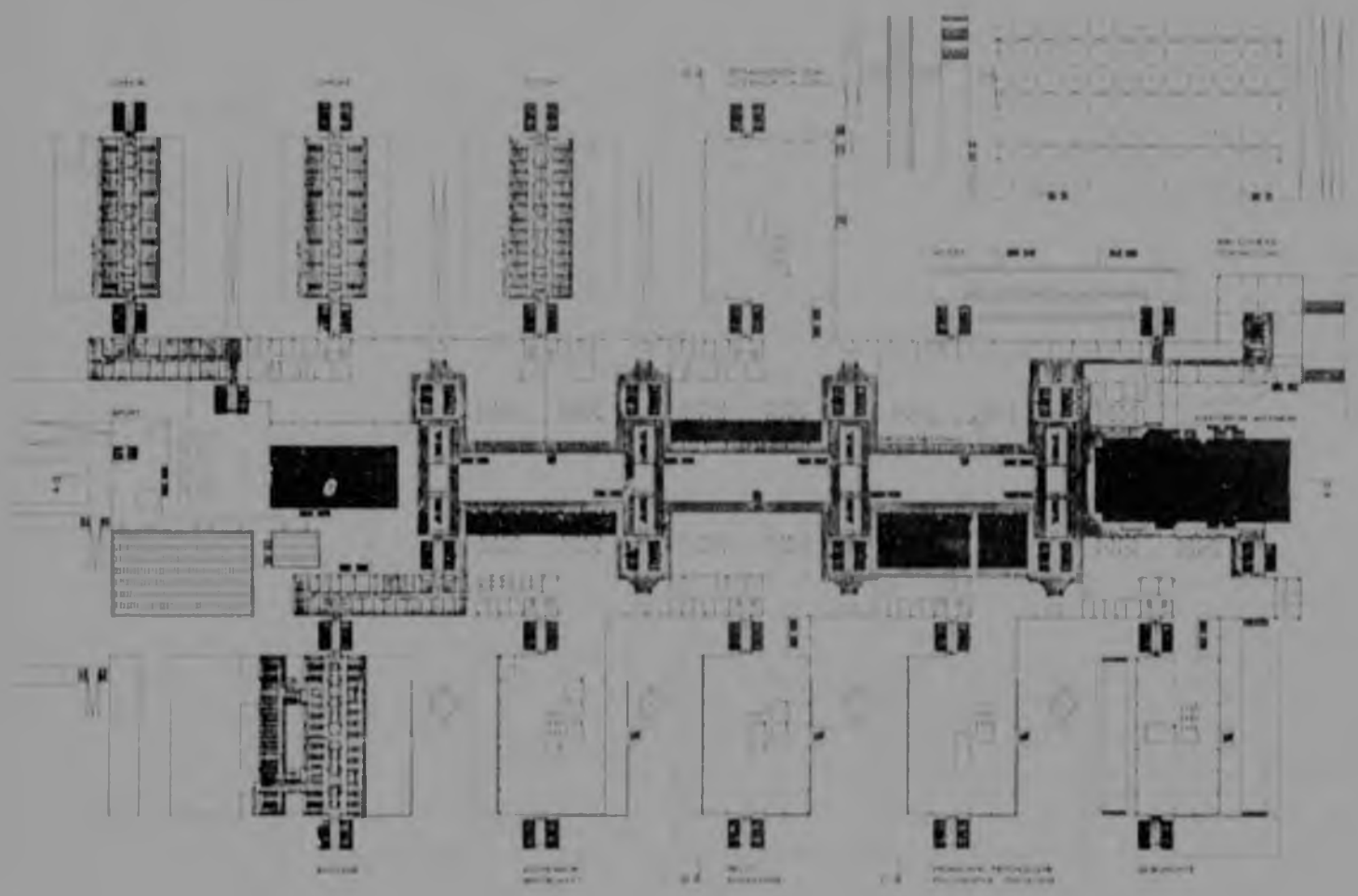
- persons studying subjects of an interdisciplinary nature are again at a disadvantage, as in a decentralized system;

- expansion is a very real problem unless the principle of self-renewal is applied;

- the initial logic guiding the configuration of faculty buildings is likely to become disrupted whenever a new faculty building is added and the spine (with the library) correspondingly extended.

Accessibility is one factor Good administration, effective library policy and efficient information retrieval are others. Advantages and disadvantages of a particular library system must be carefully weighed in the context of the specific local environment and set of circumstances.

Fig. 15.4 - Bielefeld University: Level Ono



(Source: UNIVERSITAT BIELEFELD *Planungsablauf*. Bielefeld: Architekten, 1976.)

Fig. 15.5 - Bielefeld University Library: Typical Branch Library

(Source: FUHLROTT, R. *Bibliotheksneubauten in der Bundesrepublik Deutschland, 1968-1983.* Frankfurt am Main: Vittorio Klostermann, 1983. p.22.)

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26 Ibid. p 97.

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CHAPTER 16. PLANNING FOR THE NEW TECHNOLOGY

Automation may be defined as "...the use of machinery to save mental and manual effort" (Concise Oxford Dictionary, 5th ed., 1964). In any library one will find automatic equipment which is taken completely for granted - photocopiers, calculators, electronic book security systems and typewriters. More recently the computer has made an impact on libraries worldwide, and computer technology is now interacting to a large degree in the daily work of librarians. The new technology is able to produce and disseminate information in many and varied formats, and at great speed. In its own way, the electronic revolution is having as great an effect on the availability of information as Gutenberg's invention of moveable type nearly five hundred years ago. Electronic publishing, online information retrieval, videotext services and advanced telecommunications technologies such as satellite transmission are all aspects that are changing the ways in which information is generated, stored and transferred (1). In most academic libraries the computer has become indispensible in the operation of effective library systems.

In this study it is not intended to review types of information systems nor to assess the impact of electronic communication. On the assumption, however, that libraries must inevitably become involved with this technology if they are to remain serious contenders in the information market, consideration will be given to some of the possible effects of these developments on libraries from a planning point of view.

Planners must be able to proceed with confidence that the buildings they plan today will be usable tomorrow. They should

keep in mind that libraries of the future will become more information outgoing (2). It is possible that central or large main libraries will grow even larger, offering more services. In all likelihood there will be a need for storage buildings to house increasing quantities of lesser used material. Rohlf (3) however predicts that branch libraries could possibly decrease in physical size because of the possibilities of remote bibliographic access, computer links to numerous files in the central library, and perhaps a numerical reduction in the serial holdings necessary at multiple points. Libraries should be able to send services out to academic departments in the form of bibliographical information, following up with the actual items supplied by the main library or a large branch.

The present surge of students to the library for concentrated, disciplined study, especially at times of academic pressure, is not likely to be reduced by technology. Demand for seating in the science sections could eventually diminish, since that class of information is more easily computer-stored and retrieved in laboratories, offices, and points on campus remote from the library. Generally, however, the more that technology facilitates access to information, the more will information and libraries be used, which will tend to increase, not reduce, library workloads and the size of library facilities (4).

Given these service conditions, there will be various environmental and design problems to be considered. Some computer hardware requires certain preconditions which if not provided could have a direct effect on future operations. Libraries today make use of mainframe, mini- or microcomputers, or a combination of these, in order to operate various computerized systems and to obtain information from various sources. A mainframe computer is generally the responsibility of the parent institution; the library uses it, but does not have to house it. Mini- and microcomputers are

much more frequently located in libraries. The latter generally have minimal requirements, needing only a small space on a desk top, while the former may require extensive floor space and special environmental conditions.

When installing a computer, there are two aspects to be considered - the console and the terminals. The console houses the computer and peripheral devices such as disc drives for information storage, tape drives for record conversions, and a variety of printers. The terminals are linked to the console via the data cables and are located in pre selected areas throughout the library.

Space

The space requirements for the console will vary depending on the size of the system. There should be a metre free on all sides of the system to permit engineers access during installation and for servicing. This will also allow adequate air flow around the equipment (5). As libraries grow, so too will storage requirements and it is advisable to plan for additional storage devices at the time of the initial installation. Space should also be provided to store disc packs, magnetic tapes, data processing forms, and supplies such as overdue notices, form letters, and other user documentation.

Security and Siting

In all cases where a computer is housed within a library, security should be taken into consideration. It is preferable to place computer equipment in a lockable room, usually in a windowless and controlled area of the building. It should not be located close to any radio frequency generating equipment such as radiograms, television receivers and hi fidelity systems. Some electronic equipment emits signals that can interfere with the operation of a

sensitive central processing unit (CPU), and in some cases even a photocopier may cause interference (6).

Power

Power requirements are specified by the manufacturer of the system. Power is a critical factor, especially when a new line is run into an old building. In certain circumstances the power supply may not be stable enough for computing equipment due to fluctuation and there may be a need for a constant voltage transformer to regulate it. Surges in power cause errors in the data and can damage the equipment, resulting in poor performance and excessive downtime. Therefore a dedicated circuit is recommended - a line straight from the main power box in the building which does not have any other equipment of any sort attached to it. Facility for expansion should be built in if a second phase, possibly requiring an additional disc storage unit, is envisaged. An extra dedicated line will eliminate the need for further electrical work at a later stage. Conventional wall outlets are also required, placed close to the system. These will be needed by service and maintenance personnel for their test equipment.

Environmental Considerations

Although larger CPUs may require a more strictly controlled environment than smaller ones, in most cases temperature, humidity, dust, noise and lighting should be considered.

1. **Temperature**. Fortunately the temperature range in which computers operate best is comparable to that for humans - 18° Celsius to 29° Celsius. When the temperature rises above 29° Celsius, equipment failures may occur which can reduce the life expectancy of the equipment. Computers dissipate heat, measured in British Thermal Units (BTUs), in propor-

tion to their size. The manufacturer can provide the BTU/hour measure for each piece of equipment, and an air conditioning expert may then calculate the air conditioning capacity required. The system itself, the number of people in the room, the location of windows (if any) and the degree of sunlight are all factors which must be considered. A raised computer floor with space for air conditioning ducts piped directly into machines could be a requirement, while smaller computers may require only room air conditioning (7) Because the size of computers is constantly decreasing, it is frequently found that the latter is sufficient

2. **Humidity.** In very humid areas it may be necessary to de-humidify the air, while in dry areas it may be necessary to add moisture to the air In the latter areas, if this is not done, a build-up of static electricity could have an adverse effect on the computer A humidity level in the region of 50% is suitable (8).

3 **Dust.** Incoming air should be dust-free Dust may be harmful, especially if it gets into the electro mechanical storage devices of the CPU The room containing the CPU should be kept as clean as possible, and preferably should have a higher air pressure than surrounding areas to prevent dust from seeping in under doors

4 **Noise.** Some equipment is noisy and will require isolation if it is to be installed in an otherwise quiet library environment. If possible, acoustic ceiling or wall tiles should be utilised to absorb sound.

5 **Lighting.** Lighting in the computer room is not usually a critical factor. If it is comfortable for those working there, this is adequate for the installation.

Building Requirements

Library planners should consider access. If inadequate, the size of doorways, lifts and staircases can pose formidable problems when a system is being installed. A vehicle delivery area is also very useful.

One of the most important considerations for library planning today is that of ducting, either under the floor or (preferably) contained in false ceilings, installed when the building is under construction. Most libraries being planned and built today have a three-duct system. Each duct is approximately 75 mm. wide and 50 mm. deep, although this size may vary considerably. One is used for telephone cabling, the other for electrical cable, and the third for low voltage requirements or for signalling controls. It is this third duct which is becoming so essential in modern library planning, because it carries the coaxial cables for the automation devices, and running side by side with the telephone duct, gives online accessibility. In some buildings ducts have been spaced as close as 1 m. on centres, but this is very costly. Spacing is a question which must be resolved for each individual building (9).

The location of cables as well as wall power outlets may limit or dictate the location of terminals within the library. Terminals at remote locations (e.g. branch libraries), or those not directly connected by data cable to the computer will need to be linked to the system by telephone lines. They will also require wall outlets for power.

Fire precautions are important. The computer room should be non-combustible, including walls, floor and ceiling. Portable fire extinguishers are advisable, and an automatic fire control system is recommended for larger rooms. Staff should be trained to op-

erate the emergency power-off system, whereby all equipment can be shut down simultaneously should a problem occur.

Terminals

The major consideration is space. Most will require approximately 0,4 m^2 with additional space for those operating in conjunction with light pens or similar equipment. Adequate space around the terminal is necessary for books and documentation. Environmental requirements are not too restrictive, the main one being lighting; if a terminal is wrongly located, reflection on the screen may cause eye strain on the part of the user. Light intensity should be below seventy foot candles (10), as illumination above this level will tend to bleach out the image on the screen. If static electricity becomes a problem in dry climates, equipment should be placed on antistatic mats, or antistatic spray may be used.

Human Factors

Many mini- and microcomputer systems advertise that they do not require special installations except for the addition of electric and telephone lines (11). To run the system this may be true, but the purchase of a computer system subtly changes the library. It is likely to become more service oriented. Revised layout may become necessary to effect good work flow. In addition, terminals require a different kind of work station. If one considers automation of library functions, one must consider the idea of librarians working in an environment where information is generated, organised, indexed, stored, transferred, selected, retrieved or discarded at the push of a few buttons. The speed with which an error may be compounded is hard to imagine. It is thus very important that the work station should help to prevent possible errors by being well designed and comfortable, and by being correctly placed in terms of work flow. Experience has shown that when automation

erate the emergency power-off system, whereby all equipment can be shut down simultaneously should a problem occur.

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is attempted without understanding the requirements of the people it is supposed to help, results can be disastrous.

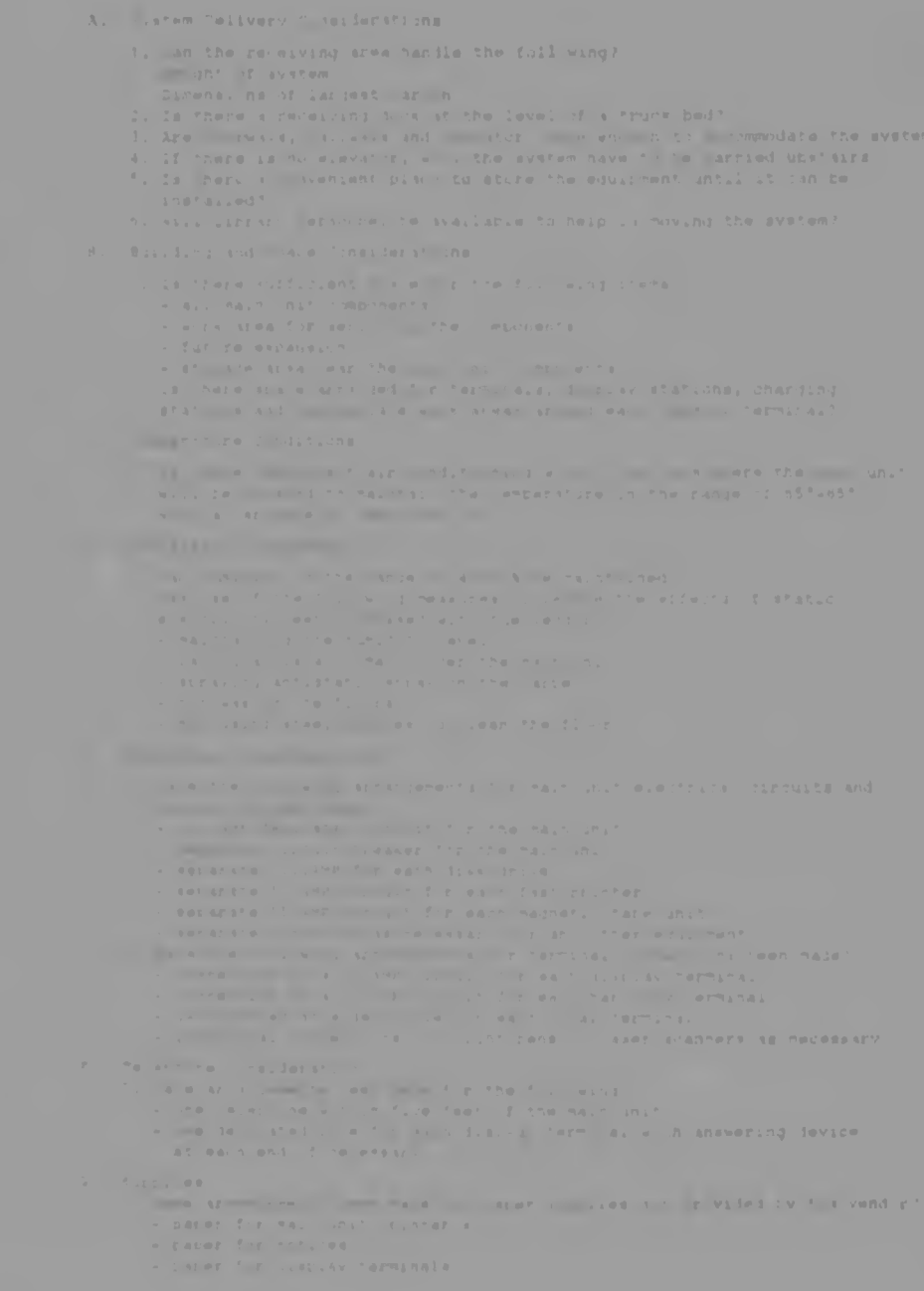
As libraries begin to make use of terminals in public areas for the use of patrons there will in all likelihood be some user resistance to the new technology. Increased emphasis on the development of 'user friendly' terminals will result, because the use of a terminal is either pleasant or unpleasant depending on the confidence the user feels in his or her own ability. Mooers (12) states:

> "An information retrieval system will tend not to be used whenever it is more painful and troublesome for a customer to have information than for him not to have it. A terminal is the computer to most users. Resistance to it means resistance to the system"

As much care as possible should be taken that library users as well as library staff find the equipment simple to operate and unintimidating.

It may be seen from the above that numerous site preparation factors may need to be considered before introducing computerized systems. Toohill (13) has compiled a checklist which summarises these factors and which is a useful guide to librarians (see Fig. 16.1).

Fig. 16.1 - Checklist for Computer Installation



(Source TOOHILL, L G *Guide to Library Automation*. Washington, D C United States Department of Health, Education and Welfare, 1980 ERIC Reports).

Comments

Despite resistance on the part of some librarians and library users there are real advantages in utilising the new technology. Automation almost always speeds up the rate at which work is performed and reduces the unit cost of that work. It usually relieves staff of repetitive chores, improves the accuracy and integrity of the files, and improves the library's ability to create, acquire, store, retrieve and use information.

Writers on computer technology have estimated that the cost of computing in South Africa is reducing at a rate of 25% compound per annum, i.e. an institution could double the capacity of its computer service for half the real cost every six years (14). This statement assumes that there will not be substantial changes in the currency exchange rate, as much of this technology is imported into the country. This decrease combined with the rising trend in labour costs, will make some degree of automation cost effective for almost all libraries in the very near future. Library planners will inevitably have to cater for the special physical requirements of computers and terminals, and the needs of the people using them.

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CHAPTER 17. PLANNING FOR AUDIOVISUAL DEVELOPMENTS

Educators today are becoming increasingly concerned about the way in which students are taught and they are beginning to make use of all available means of communication in the process of instruction. Many teachers use audiovisual aids to augment lectures. Others permit students to listen to tape recordings or watch videocassettes instead of attending lectures. Others are interested in producing their own instructional materials such as tape slide programmes and videos which allow the student to study at his own pace. Foreign language courses regularly employ language laboratories. As more students are educated in school systems that utilize educational technology it is inevitable that educational changes will take place at university level.

Although the academic library is being drawn into these developments, the response on the part of librarians is not always enthusiastic. The high cost of hardware and facilities, of staff, and of training these staff members as media specialists has dampened enthusiasm in many cases. Other problems are the cost and difficulty in servicing equipment; of providing backup systems for those that are being repaired, have missing parts or have been stolen; and incompatibility of systems. Despite these difficulties, university librarians should be careful not to distance themselves from the instructional process. They are involved in higher education, and should provide for the teaching needs of the faculty, whatever the format. They should be tackling with enthusiasm, not suspicion, the task of building up a worthwhile audiovisual collection and of selling its services to staff and students alike. With the growth of distance learning, self paced learning, individualized learning and the need to continue to learn throughout

one's lifetime as career patterns change, the roles of teacher and librarian merge towards the common goal of knowledge transmission. The combination of the librarian, the teacher, and information and audiovisual technology can provide a formidable force in the learning process (1).

For the purposes of this study, emphasis is not on the learning resources centre as such, but rather on the traditional book-oriented academic library into which non print materials are being increasingly integrated. The special preparation of areas for the use of these materials is essential, and planners and architects should give careful consideration to:

- learning spaces for individual students and different sized groups of students;

- spaces for the production (possibly), maintenance and storage of equipment and materials

A number of questions should be asked when planning these facilities:

- What will students be doing in these areas?

- What are their needs?

- What is the size of the physical facility required?

- What is the budget for developing the facility?

- What hardware and software will be placed here?

- In what size groups and for how long will students be using the facilities?

Planners may benefit greatly by involving the users themselves in the planning process.

Environmental Factors

Students may spend long periods of time in the audiovisual area Thus every effort should be made to create a pleasant and visually attractive environment Whether part of a new library, an addition to an existing plant, or renovated space, attention should be given to the proportions of the main areas of the audiovisual ce tre to avoid long narrow low ceilinged spaces that are undesirabl from both the aesthetic and functional standpoint Selection of paint colours, furnishings and materials for floors, walls and ceilings should be coordinated to produce harmonious surroundings in which environmental control, lighting, acoustics and maintenance factors have all been given proper attention

In a study of the interaction of people with their environment, Sommer (2) concludes that the environment is not neutral in teaching and learning Studies of libraries show that a strong relationship exists between layout, perception of activity, student characteristics, interaction patterns and use of space. This suggests that designers ought to give close attention to each of these variables. What takes place within these learning spaces is a highly complex psychological, sociological and physical interaction, and it is possible that social scientists may have a significant contribution to make to the design of these areas

Flexibility

This is of the utmost importance when one is working with a limited budget and attempting to accommodate varying numbers of students and types of equipment Flexible arrangements will require moveable furniture and fittings, which are likely to include chairs,

tables, screens (for projection), screens (for dividing up spaces), equipment trolleys, whiteboards and display boards An adaptable space will easily facilitate the growth in use of one kind of material, decline in the use of another, an increase in the amount of equipment required. or the replacement of that equipment with up-to-date models.

Power

Many libraries provide electrical outlets around the perimeter of a room or area, but this may be restrictive Outlets at building columns should always be available as study stations containing equipment can often be located advantageously near such columns. If facilities are needed in open areas the power column may be used. This is a pole that extends from floor to ceiling where power is available Although unattractive and a traffic hazard, they are flexible, inexpensive and have much to recommend them (3) At the time of construction thought should be given to a building-wide system for wiring and cabling This is most easily done via ducting contained in a suspended ceiling and will provide for possible future expansion

Lighting

Lighting systems need to be suitable for all the activities which occur in the audiovisual centre, and these should be identified at the planning stage They may include note taking; projection of slides, films and overhead transparencies viewing of television or computer terminal screens; displays of various kinds; and discussion. Appropriate levels of illumination on screen and display surfaces, work surfaces and surroundings need to be considered, with a suitable means of controlling these levels as well as natural light sources It is advisable to have wall light switches with dimmers located at both the front and back of the viewing

area for the convenience of lecturers and operators. For projection purposes lights should run parallel tc the front of the room, not towards the screen. 'f this is not possible, a combination of incandescent lighting at the back and fluorescent lighting in the front is recommended the fluorescent lights may then be switched off for viewing purposes In order to obtain the best image it should be possible to lower the level of light in audiovisual areas to 1/10 foot candle.

Natural light may be blocked in a number of ways

- Opaque shades held within a metal track which prevent light from entering If tracks are not available shades one size larger than the windows, providing an overlap area, are very effective.

- Opaque curtains which should extend below the bottom of the window Weighted hems add to their effectiveness

- Venetian blinds.

These controls are recommended for front or rear projection onto screens. However, total black out facilities are not normally necessary for much of the modern viewing hardware available today, which is designed for successful operation in normally lit rooms with no loss in viewing quality (4).

Acoustics

Acoustic considerations include the distribution of sound within the space, the passage of sound between spaces, and levels of background noise Because there may be a high degree of movement and considerable noise within an audiovisual centre it is necessary to plan for the acoustic difficulties that will be en

countered. Curtains, soft floor coverings and sound absorbing screens will be useful for this purpose, and some areas may be improved by carpeting the back wall. Most media hardware operates relatively quietly, and carpeting and curtaining will absorb any motor noise generated. Media operating in open areas should be used with headphones, and these should be of sufficient quality to prevent sound from carrying into surrounding spaces. Noisier machines should be relegated to closed rooms or separate areas.

Furnishings

Furnishings include seating, work surfaces, room dividers, storage units, curtains and floor coverings. They should all meet functional, aesthetic and ergonomic criteria acceptable to the planner.

Seating may be fixed, moveable, or a combination of both. Fixed seating has the advantage of ensuring that every occupant is in the proper relationship to display surfaces and screens, but limits flexibility and is possibly only appropriate in a lecture theatre or small auditorium located within the library. Moveable seating permits flexibility in arranging rooms to meet particular requirements. Some commercially available seats have their own tablet arms for writing, but these arms are often far too small for student needs. Where moveable seating is provided, it is preferable to have a flexible arrangement of tables which may be used for seminar or discussion groups. Trapezium tables are particularly adaptable in this respect. Moveable screens are useful to break up larger rooms into smaller work areas, and these may also be used as display surfaces or projection screens (5).

Six main factors may be identified in the process of furniture selection (6):

1. **Design.** Furniture should be designed or selected which is appropriate to the building type and the atmosphere to be conveyed. It should also be comfortable and convenient to use. Much can be achieved with a combination of design, fabric texture and colour.

2. **Comfort.** A significant trend in audiovisual centre planning today is the movement away from the study carrel to the open furniture arrangement. While some students still prefer the carrel, a large number will choose more comfortable study environments when given the opportunity.

3. **Ease of Adjustment.** This is a consideration with shelving, for example, which may need adjustment with regard to height and width in order to accommodate a variety of material.

4. **Repairs.** Furniture, fixtures and equipment in the audiovisual centre are likely to be subjected to heavy use. Factors such as durability and ease of repair should be considered when purchases are made.

5. **Safety.** Planners should consider safety factors with regard to furniture and equipment.

6. **Service Life.** This is not easy to assess at the time of purchase, as much will depend on the amount of use made of an item. Upholstered chairs wear very easily, but most will last for at least seven years.

The audiovisual carrel is an important part of the seating allocation of the audiovisual centre, and is also a storage unit for an extensive array of equipment. The individual carrel may be merely a semi-private study cubicle, or it may be a sophisticated multimedia station incorporating sound and picture in a variety of

configurations (see Fig. 17.1) Large items of equipment will often be placed permanently in carrels because of weight and wear and tear suffered when transported frequently When carrels house equipment, they should be oriented so that hardware is easily visible to staff as well as library patrons, in order to discourage vandalism Smaller items of equipment, such as audio cassette players, will last longer and need repair less often if charged out from the lending desk rather than being built into tables or carrels In most cases where media hardware is to be placed in open library spaces carrels are the ideal location. they offer a measure of privacy, they reduce noise. they may be easily wired for electrical power. and they may be custom built to accommodate certain types of equipment An audiovisual carrel has the following approximate dimensions (7):

Overall height:	1 200 mm. - 1 525 mm.
Tabletop height:	710 mm. - 760 mm.
Overall width.	1 220 mm.
Overall depth:	1 070 mm
Inside depth:	840 mm.

These dimensions vary according to individual requirements In general a sturdy design able to withstand some abuse should be used, and the working surface should be resistant to scratching

Storage

Shelves housing audiovisual materials should not be separated from the main areas by partitions. They should be easily accessible. Double sided shelving in rows with stack centres at 1,37 m., allowing a clear aisle width of at least 915 mm is suitable Island shelving should be avoided within user areas, except where counter height units are used to define spaces Special provision should be made for housing collections of posters, maps and charts. A variety of cabinets is available

Storage space is needed for audiovisual equipment. The area should be equipped with 305 mm and 380 mm. deep adjustable shelving. Aisles should be wide enough to facilitate easy movement of equipment, and sufficient space should be left free of stacks to allow for housing large items of equipment on trolleys.

Traffic and Supervision

Although the audiovisual centre should be designed and located so as to be highly visible and easily accessible to all students entering the library, heavy traffic routes penetrating or separating major elements of the centre must be avoided. Design should provide supervisory personnel at their work stations with good visual control over the public areas of the centre, including entrances and exits, reading room and shelving areas.

Physical Requirements of the Various Media

1. **Listening equipment for audio recordings.** The trend is away from the old dial access systems towards providing individually controlled players with headphones. The players may be grouped in one part of the centre to facilitate supervision and servicing. In addition it will also be necessary to make provision for group listening. A small study room will serve well as long as it can accommodate a table and a few chairs and has a source of electrical power. Larger groups may be accommodated in larger study or seminar rooms. Headphones produce enough fidelity for most general listening, but not for advanced music study. For this purpose some librarians will wish to have one or more rooms equipped with built-in speakers, which should be located at ear level. Unless these listening rooms can be fully isolated, they should be given careful acoustic treatment.

2. **Television/Video tape players.** Some new video tape recorders require only electrical power outlets, thus eliminating the need for coaxial cables. However, if a university has a campus-wide closed-circuit system, provision should be made for using closed-circuit television within the building (8). Even though many campuses have not yet made use of television in their teaching programmes, it is certain that where they do, the library is the easiest and most accessible place for the student to go to view a programme (e.g. at the University of the Witwatersrand). This type of media is usually housed permanently in carrels, located within easy reach of a service desk, with cassettes or videodiscs stored on shelves or in cabinets nearby.

3. **Cassette-tape recorders.** Small cassette tape broadcasting systems with a loop antenna are convenient where a group of students, each using his own headphones, wishes to listen to a tape at the same time. This facility is popular, especially where comfortable furniture is provided. It is likely that the library will require many cassette players, and because of the problem of theft, they should be stored either behind the service desk or in locked cupboards. There is no specialized furniture [illegible] sing these items; in most cases they are stored on s.

4. **Computer interactional keyboards and microcomputers.** These are now frequently provided for students, and it is only a matter of time before most libraries will need to make them available (see Fig. 17.2). Computer technology is evolving so rapidly that planners should seek specialized advice at an early stage in planning this part of the audiovisual centre.

5. **Slides and Slide/tape programmes.** These are most easily used in individual carrels where the equipment may be semi-permanently stored.

6. **Films, Overhead transparencies** Facilities for projection require careful consideration. Good quality image is required on the screen if students are to watch in comfort with minimal visual and postural stress. Screen size should be scaled to room size (see Fig. 17.3). This is determined by taking the length of the room and dividing by six for optimum viewing and by eight for marginal viewing. The front seats should be at a distance of twice the screen width (2W) away from the screen, while the back seats should be 6W away. The ideal viewing angle is 30^{o} on either side of the centre, but is acceptable up to 45^{o}. The best viewing area is in the centre, and thus side aisles should be used in preference to a centre aisle. The screen should be mounted 1,2 m. off the floor, so that people may see over the heads of others (9). Corner screens are possible, but not as ideal as front screens, as they lead to postural tension in the viewer If a corner screen is used in a room with windows on one wall, it should be placed in that corner so that it faces away from direct light.

7. **Television.** The general rule for group viewing of television is one person per 25 mm. of the display diagonal No viewer should be closer than 2,14 m., especially in the case of colour television A viewing angle of 45° either side of centre is marginally acceptable.

In general the following viewer distances are recommended for various types of audiovisual material (10):

- 1W - Recommended minimum distance for multiscreen viewing

- 2W - Distance at which 70% of total acuity takes place Recommended minimum distance for most media.

- 3W - Recommended maximum viewing distance for multiscreen viewing.

- 4W - 80% total acuity Recommended minimum distance for television viewing and maximum for displays having exceptionally small symbols.

- 6W - Recommended maximum for viewing most media particularly commercially produced motion pictures

- 10W - Recommended ideal maximum distance for viewing television.

- 14W - Traditional maximum distance for viewing television.

Useful detail regarding criteria for effective reproduction of various kinds of media, and the design factors which should be taken into consideration, may be found in *The Encyclopaedia of Educational Media Communications and Technology (1978)*(11).

Media Production Centre

According to Lushington (12), no media centre may justifiably call itself such unless it has production facilities Many audiovisual centres in academic libraries today are providing production space for use by academic staff and students. This may range from a well-equipped, acoustically treated complex consisting of a darkroom, model-making room, tape recording studio and an area for charts and reprographics to a general workroom of modest size containing a work counter, running water and cupboard and shelving space In either case the underlying philosophy is that

such facilities will act as a catalyst for innovative and effective teaching. Functions of the production area could include preparing and producing overhead transparencies, slides, slide/tape programmes, visuals for videos, models, individualized instruction packages, audio materials, charts and graphs, brochures, pamphlets and posters. Areas required for each function will vary with the size of the audiovisual centre and of the university itself.

Comments

One can see from the above that the effect of audiovisual development on the library is generally more pervasive than at first expected. There is little doubt that the impetus towards use of audiovisual material and the expansion of facilities in this field have come from the teaching side. This is possibly due to the realization that the lecture, followed perhaps by a question and answer session, is not necessarily the best method of conveying information. This is particularly applicable where there are increasing student numbers, and in South Africa especially, an increasing number who for reasons of their home background and inadequate schooling might have difficulty in coping with their courses.

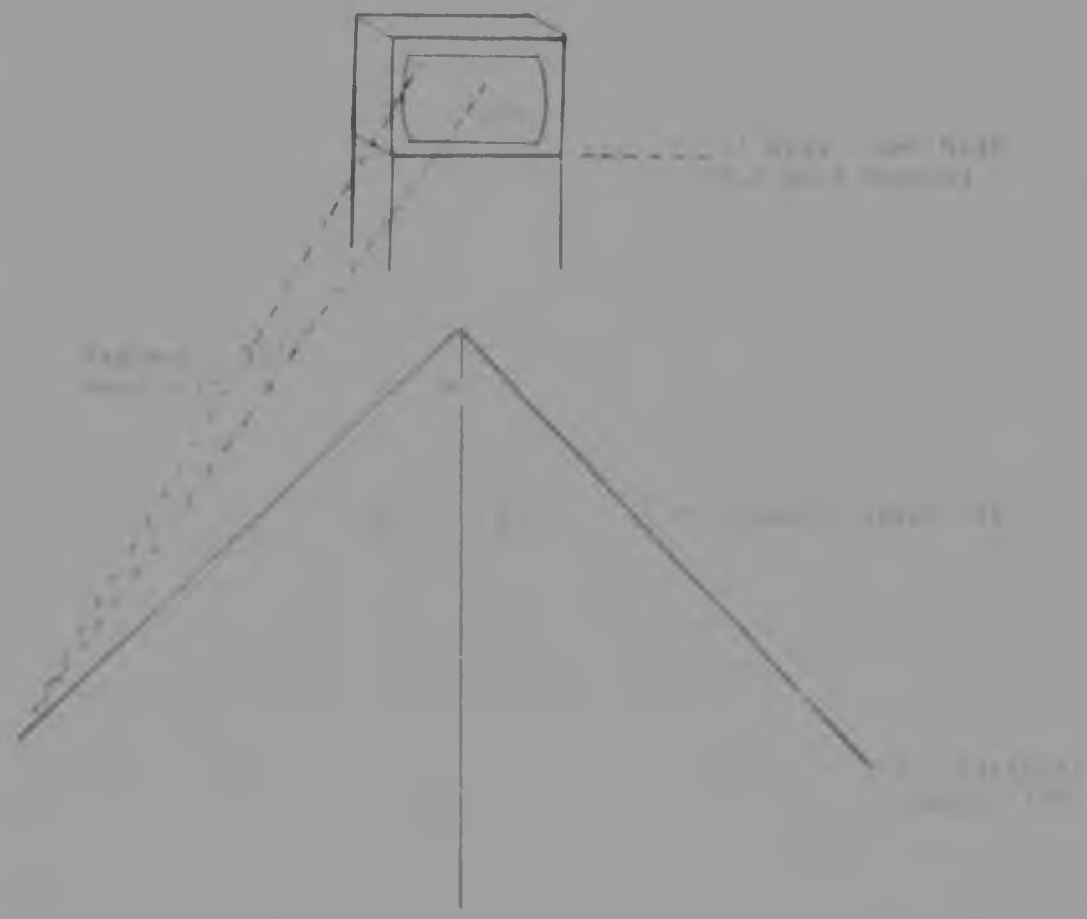
In terms of library planning, the learning environment must be carefully designed. Few educators can visualize suitably innovative building solutions to educational needs, and unfortunately the average architect is in no position to advise his client. However, as long as certain important considerations are kept in mind, planners should be able to devise suitable spaces to accommodate audiovisual material. Major factors are flexibility, lighting, adequate wiring and cabling, appropriate furnishings, storage facilities, a variety of comfortable study areas, and acoustic treatment. Gill (13) states

"While ... most librarians have accepted that the chart and film strip sit together more amicably in the catalogue than in containers on a bookshelf, the general effect of the inclusion of non-book materials has been to stress the immediacy of library service. This trend is welcomed; the library is seen as being an active agent in the learning process and not merely an archive".

Fig 17.1 - Audiovisual Carrel, Brighton Polytechnic, England

Fig. 17.2 - Computer Terminals for Self-Instructional Programs, Brigham Young University, United States of America

Fig. 17.3 - Screen Size in Relation to Room Size



(Source MOLDSTAD, J *Designing Facilities for Optimum Use of Instructional Technologies*. Instructa 1984 Rand Afrikaans University, Johannesburg July 1984)

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CHAPTER 18. SPACE MANAGEMENT

The pressures of increasing student numbers and expanding research activities have led to an increase in the demand for space at the same time as financial restraints have placed firmer controls on the supply of space. These developments over the past few years have forced many universities in countries such as the United States and Great Britain for the first time in their histories to enquire seriously into the utilization of space (1). The relatively new discipline that integrates space requirements of the physical facility with the planning process of the library as a growing, changing organisation is known as space management (2). Academic libraries today are constantly undergoing change and rearrangement and good space management will be needed if they are to remain flexible, efficient and comfortable.

Modular Planning

In considering space, it is necessary to determine how usable that space is. The space becomes functional when it can *actually* be used. Assignable areas are those that can *potentially* be used. Cohen (3) gives an example of a space 300 m long by 3 m wide. The assignable area is 900 m^2. But in fact the usability of the space is greatly impaired by its long, narrow shape, and it could probably be used only for wall mounted shelving, the majority of space being used for corridor access. The total assignable space may appear generous, but usability is questionable. Usability increases in square or rectangular areas, with columns placed at regular intervals. This is known as modular construction, a method used extensively in libraries today.

The aim of modular planning is to ensure that any part of the building may be used for any purpose as far as possible, with the obvious exception of the core areas containing stairways, toilets, lifts and mechanical facilities. It is done in order to provide flexibility, which is necessary if we are to have library buildings which can adapt to future requirements.

Modular planning does have its weaknesses. Firstly, it tends to cost more. Secondly, no one column spacing is ideal for all library purposes. Thirdly, some librarians on moving into a modular building have felt that since it could adapt easily, it was unnecessary to plan in advance, and have found themselves within a year wanting to institute changes. These changes may be easy and relatively inexpensive, but if they involve lighting, ventilation and internal partitioning, they can be costly. However, despite these drawbacks, there is wide agreement that regular column spacing is desirable because it gives the necessary flexibility and freedom in planning for the future (4). As Thompson (5) points out, although only the architect and his engineering consultants are concerned with most aspects of modular construction (material, strength and shape), the librarian is directly interested in the positioning of the columns. If they are placed at intervals inappropriate for the library's economic operation, results will be disastrous.

The distance between the centre of one column and that of the next is dependent upon the answers to a number of questions (6):

1 **What is the size of column necessary to hold up the building without bearing walls?** This will depend on the method of construction, whether the columns are primarily steel, or whether they are concrete reinforced with steel. Another factor is the height of the building. In a multi-storey building, the columns will have to be larger or closer together in

order to support the building. The width of a column at right-angles to the direction of the bookstacks should be no greater than the depth of the double faced stack. If this is 450 mm from front to back, then the column should not exceed 450 mm However, it may be necessary to make it wider in the other direction in order to provide sufficient support.

2. **How will the ventilating, heating, mechanical and wiring systems be arranged?** If the service ducts are carried up through the centre of the columns or through outside walls, they create a certain amount of fixed function It is becoming more usual to run them along the ceiling, either concealed within a false ceiling or in ducts projecting below the ceiling.

3. **What is the acceptable length of shelves or stack units?** In Britain, the United States and South Africa (as well as many other countries), 915 mm is the standard length of library shelving. The standard distance between centres of stack ranges is generally 1,37 m Twice this is 2,74 m., and with a standard shelf length of 915 mm interchangeability of direction is possible

4 **Length of stack range** before reaching a cross aisle is important. The only justification for long ranges is to save the space taken up by the cross aisle The length of the ranges should bear some relation to their use and the width of the aisle e.g. a very long range would be unsuitable for heavy use and narrow aisle width.

5. **Should the columns be spaced equidistant in both directions?** An advantage of the square bay is that it makes it possible under certain conditions to shift bookstacks (or any other equipment) through 90°. However, care should be taken regarding lighting

In any library a 6,1 m distance between colum's is the minimum suggested Anything less than this will severely affect utilization of space, and it will be difficult to design the interior properly. The column spacing generally recommended in academic libraries is 6,86 m., 7,79 m., or 8,24 m If bookstacks fall between columns, they require a clear space that is a multiple of 915 mm., plus a little space for stack ends

Ellsworth, in his book *Planning Manual for Academic Library Buildings (1973)* (7) gives a clear description of modular dimensions The size of the module depends primarily on cost vs book storage efficiency The longer the distance between columns the higher the cost will be However, if the distance is too short a multitude of columns will get in the way of readers and bookstacks The most the librarian can do is define the problem and talk to the architect about what is involved the architect and his engineer must make the decision in the long run

Floor Size

There has been some discussion as to the optimal size of the floors making up a library (Cohen and Lushington), and it is generally recommended that they do not exceed 1 860 - 2 790 m^2 on one level. These areas refer to American libraries and it is unlikely that South African university libraries would contain floors of this size. Very large spaces become difficult to control, more service points are usually required, and hence more staff needed Floor areas should be planned for flexibility so that they may be easily subdivided if necessary, care being taken of exit and entry points, the stairwell and the plumbing, electrical and mechanical core Cohen (8) suggests that in any library the length of the space should reflect the width, and this ratio should not exceed 2 1, otherwise a long, narrow and somewhat impractical space will result.

Building Height

It is also suggested that buildings contain no more than three floors. The ideal situation would be a building stepped down on a hillside with the main entrance on the second level e.g. University of Denver Library. Users would then be required to walk one flight of stairs either up or down to reach any part of the library, and this is the most functional design in terms of traffic patterns.

Having looked at the physical structure of the library with regard to space management, library planners must then give careful consideration to the internal environment and the way in which this will affect the users of the library, their needs and their comfort.

Library Environment

Although much emphasis today is placed on the library's ability to satisfy the user's needs through the availability of a variety of materials and services, it is also very desirable that the environment contribute to his library experience in a positive way. A patron who can relate to and enjoy the atmosphere of the library is more likely to return than the user who merely obtains the item of information he requires. Mason (9) states:

> "The interior design is the most important single element in generating the use of any library dedicated to serving undergraduates... If a library feels good to be in, it will be used even though the air conditioning freezes, the lighting obscures, the bookstock dwindles and the staff offends. Though the architect lead the student through labyrinthine ways, yet will he follow if it feels good to be there".

Unfortunately the library's internal physical appearance is sometimes neglected, and bad design of the building and its facilities i.e. faulty symbolization and visualization of what the library is really offering, can become a barrier to library use. Too seldom do librarians bother to find out what their users really need in a library environment. Methods of teaching today encourage students to take more initiative in the learning process, and thus they make greater demands on the library and its services than in the past. If the librarian is to manage his space effectively, his physical plant must assist in this learning process.

The increasing use of audiovisual materials and the computer have given rise to new functions and uses of libraries, and these are reflected in a need for new design characteristics:

- Integrated design to accommodate a wide range of media;
- Centralized information and service centre run by professional staff from which various services may radiate;
- Flexibility of facilities and equipment to make change easy and possible;
- Spaces of various shapes and sizes to ensure user choices;
- Appropriate storage for materials of various types, arranged for rapid and convenient retrieval;
- In addition properly designed graphics, furniture, lighting and functional relationships can contribute greatly towards the creation of an attractive and comfortable environment.

It is not always easy to achieve all these design objectives. For example, how can detailed design be accomplished while retaining

flexibility? Or how can staff control be maintained while ensuring individual privacy and freedom? The resolution of these conflicting concepts is the key to good design.

Many recent library designs, recognising the need for flexibility, have featured open modular buildings with moveable partitions, numerous electrical outlet points, excellent lighting and quantities of ventilation outlets. But the library planner faced with a large, flexible space must be careful that he does not create a lifeless desert which does not cater to the varied requirements of different library service areas. A flexible space can be the beginning of a useful design, but it must be followed with careful selection of furnishings, equipment, lighting and graphics to breathe colour and life into the library activities that will take place there (10).

The environment should encourage a simple pattern of access and use, with quiet and busy areas separated from each other. Quiet areas may include widely spaced individual seating with sound absorbing materials in walls, floors and ceilings. Bookstack areas may separate these from the noisier environments, but care must be taken to keep books grouped in easily definable subject areas, with graphics clearly delineating these areas. Noisy areas will encourage communication through the provision of group seating and media that is audibly and visually noisy - current journals, newspapers, tapes, films and videos. General illumination, bright colours, hard-edged surfaces and angular furnishings can contribute to this setting.

Most libraries provide a wide range of seating choices:

Lounge seating:	5%
Individual rooms:	Up to 5%
Individual desks/carrels:	Up to 75%
Group rooms (5-10 persons):	Up to 5%
Group seating at tables (4 persons):	No more than 10%

Group seating is the least costly kind, so there will be a natural tendency to provide more of this kind of seating than library users really want (11). The library planner should try to provide as much variety of seating and environment as possible, keeping the user's comfort in mind at all times. For example, it is not sufficient merely to provide study carrels for the serious student. It should be remembered that most people when they concentrate, prefer to protect their backs and sides - they are not comfortable in situations where they may be approached from behind. Thus carrels should not face away from passages and traffic lanes, but should rather be perpendicular to them. People working in noisy, active areas seem to be more tolerant and generally do not mind which way they face. Whether areas are active or passive will often depend on distance from the entrance or major walkways. Active areas should be placed near one another and close to the entrance, and beyond this section facilities should exist for the more serious student who prefers a quiet study environment.

Another factor which may affect the user is ceiling height. High ceilings seem to encourage movement, while low ceilings have the opposite effect. For this reason soaring ceilings, if they exist at all, should be confined to the foyer or main service area. If found in reading rooms, they will have a negative effect, as users, once seated, may feel small and insignificant. This could partly explain why study carrels are invariably so popular. The protection afforded by the carrel sides makes the immediate surroundings more human.

Personal observations of student behaviour indicate that:

- The group study room is helpful as students sometimes like to work together in small groups;

- Small lounges where casual seating is provided are popular, as are smoking rooms;

- Carrels are greatly appreciated, especially near examination time;

- The rooms that work well are not tidy and neat; they are well-used and look it

- A cluster of different reading facilities allows some users to look out of a window; others to sit in lounge chairs and put their feet up; others to study in work carrels adjacent to the bookstacks.

An economic and spacious library that supplies a good service is a positive asset. An even more positive asset is a facility that is functional and aesthetically pleasing at the same time. Good looking space brings vibrancy to a library's image.

With libraries adapting to change and the new technology, the library planner should be aware of the size and type of spaces required, as well as the furniture and equipment they contain or are likely to contain. In addition to this, he should be aware to a certain degree of the psychology of human nature. If he takes into consideration both the information and environmental needs of his patrons, the facility is likely to be well used. As Metcalf (12) says: "A poor building can seriously handicap students and professors; a good one can contribute to the intellectual health of the whole institution"

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